ENVIRONMENTAL ASSESSMENT FOR SOLSTICE CREEK STEELHEAD RESTORATION PROJECT

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SECTION 1.0 – SUMMARY

The National Parks Service (NPS) and the Resource Conservation District of the Santa Monica Mountains (RCD) plan to restore steelhead habitat in Solstice Creek by removing the barriers to fish passage. The project's purpose is to remove the barriers to establish unimpeded fish passage through the nearly one mile reach upstream of the NPS parking area in Solstice Canyon. The proposed project plans to remove the three check dams and four Arizona crossings that impede fish passage upstream of the parking area. The removal of the two lowest barriers, at Pacific Coast Highway and Corral Canyon Road, is not part of the proposed project. The removal of the three check dams and Arizona crossings will insure that when the two lower barriers are removed at a later date, steelhead will have a significant length of streambed available for spawning.

Two alternatives are evaluated for the proposed project. The first alternative would remove all of the check dams and all of the Arizona crossings. The second alternative would remove all of the Arizona crossings, but would leave part of each of the check dams in place. For each alternative, two sub-alternatives are addressed. These subalternatives are (1) no removal of sediment that has accumulated behind the check dams and (2) partial removal of bed sediments behind the check dams to recreate a more natural stream grade throughout the reach. In addition, the No Action alternative is analyzed.

Because the implementation of either of the alternatives would be similar, the environmental impacts of the two alternatives are similar. Adverse impacts are short-term and involve temporary disturbance during the demolition of the dams and Arizona crossings. Both alternatives would provide the long-term benefit of removing barriers to the passage of steelhead and other fishes. Both alternatives also would remove hazardous drop-offs at the road crossings and the potential safety hazards of the dams and associated pools. Complete removal of the check dams and Arizona crossings would more fully restore the natural setting of the creek than partial removal of the dams would, and so it is the environmentally preferred alternative.

SECTION 2.0 – PURPOSE AND NEED FOR THE ACTION

Solstice Canyon is a 550-acre park within the Santa Monica Mountains National Recreation Area in Los Angeles County (Figure 1). The National Park Service acquired Solstice Canyon from the Santa Monica Mountains Conservancy in 1997. Solstice Creek, which flows through Solstice Canyon to the Pacific Ocean, historically supported steelhead (*Oncorhynchus mykiss*). The Southern California Evolutionarily Significant Unit of steelhead has been listed by the federal government as endangered and by the California Department of Fish and Game as a California Species of Special Concern. Steelhead are the ocean-going (anadromous) form of rainbow trout. They are born in fresh water, then migrate to the ocean, and return to freshwater to spawn.

The National Marine Fisheries Service has evaluated the potential for Solstice Creek to support steelhead and determined that the stream habitat appears suitable from the ocean to the waterfall adjacent to Tropical Terrace, approximately 1.8 miles upstream from the mouth of Solstice Creek (Spina and Johnson 1999). This waterfall is a natural barrier to steelhead. However, several barriers prevent steelhead passage from the ocean to the waterfall. Figure 2 shows the potential steelhead habitat in Solstice Creek and the barriers to steelhead passage. These barriers include several check dams and Arizona crossings upstream of Corral Canyon Road.

The NPS and the Resource Conservation District of the RCD plan to restore steelhead habitat in Solstice Creek by removing the barriers to fish passage. The project's purpose is to remove the barriers to establish unimpeded fish passage through the nearly one mile reach upstream of the NPS parking area in Solstice Canyon. The proposed project plans to remove the three check dams and four Arizona crossings that impede fish passage upstream of the parking area. The removal of the two lowest barriers, at Pacific Coast Highway and Corral Canyon Road, is not part of the proposed project. The removal of the three check dams and Arizona crossings will insure that when the two lower barriers are removed at a later date, steelhead will have a significant length of streambed available for spawning.

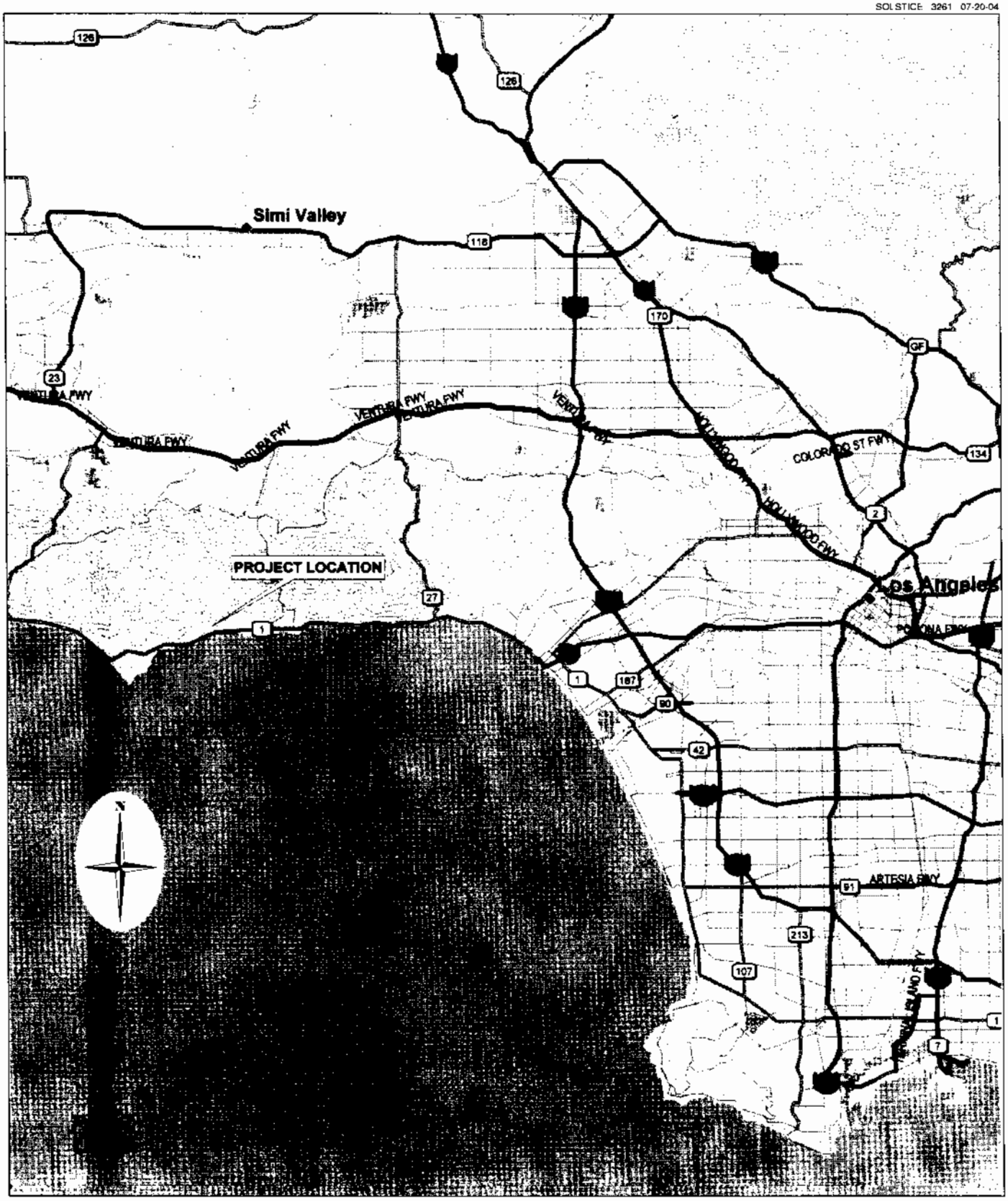
Two alternatives are evaluated for the proposed project. The first alternative would remove all of the check dams and all of the Arizona crossings. The second alternative would remove all of the Arizona crossings, but would leave part of each of the check dams in place. For each alternative, two sub-alternatives are addressed. These subalternatives are (1) no removal of sediment that has accumulated behind the check dams and (2) partial removal of bed sediments behind the check dams to recreate a more natural stream grade throughout the reach. In addition, the No Action alternative is analyzed.

2.1 RELATIONSHIP TO EXISTING PLANS

The Recreation Area recently updated its 1982 General Management Plan (GMP). The draft GMP/ Environmental Impact Statement was released for public review in January 2001. Although the NPS did not manage the project area when it prepared the 1982 GMP, that plan specified that " . . .altered ecosystems will be restored to more natural conditions wherever possible." The proposed project analyzed in this Environmental Assessment (EA) supports the restorative objectives of the 1982 GMP and the draft 2001 GMP.

The Recreation Area has completed a Strategic Plan that presents a five-year outline of goals and objectives for the years 2000 to 2005, including restoring parklands, improving the local status of federally listed threatened and endangered species, improving visitor satisfaction, and improving visitor safety. The proposed project analyzed in this EA meets all those goals.

In addition, a plan to restore fish passage and riparian habitat along Solstice Creek has been prepared by the NPS and the Santa Monica Mountains Resource Conservation District, in cooperation with the California Department of Transportation, the National Marine Fisheries Service, the U.S. Fish and Wildlife Service, the California Department of Fish and Game, the California Department of Parks and Recreation, California Trout, and other state and local organizations. The Solstice Creek restoration plan identifies

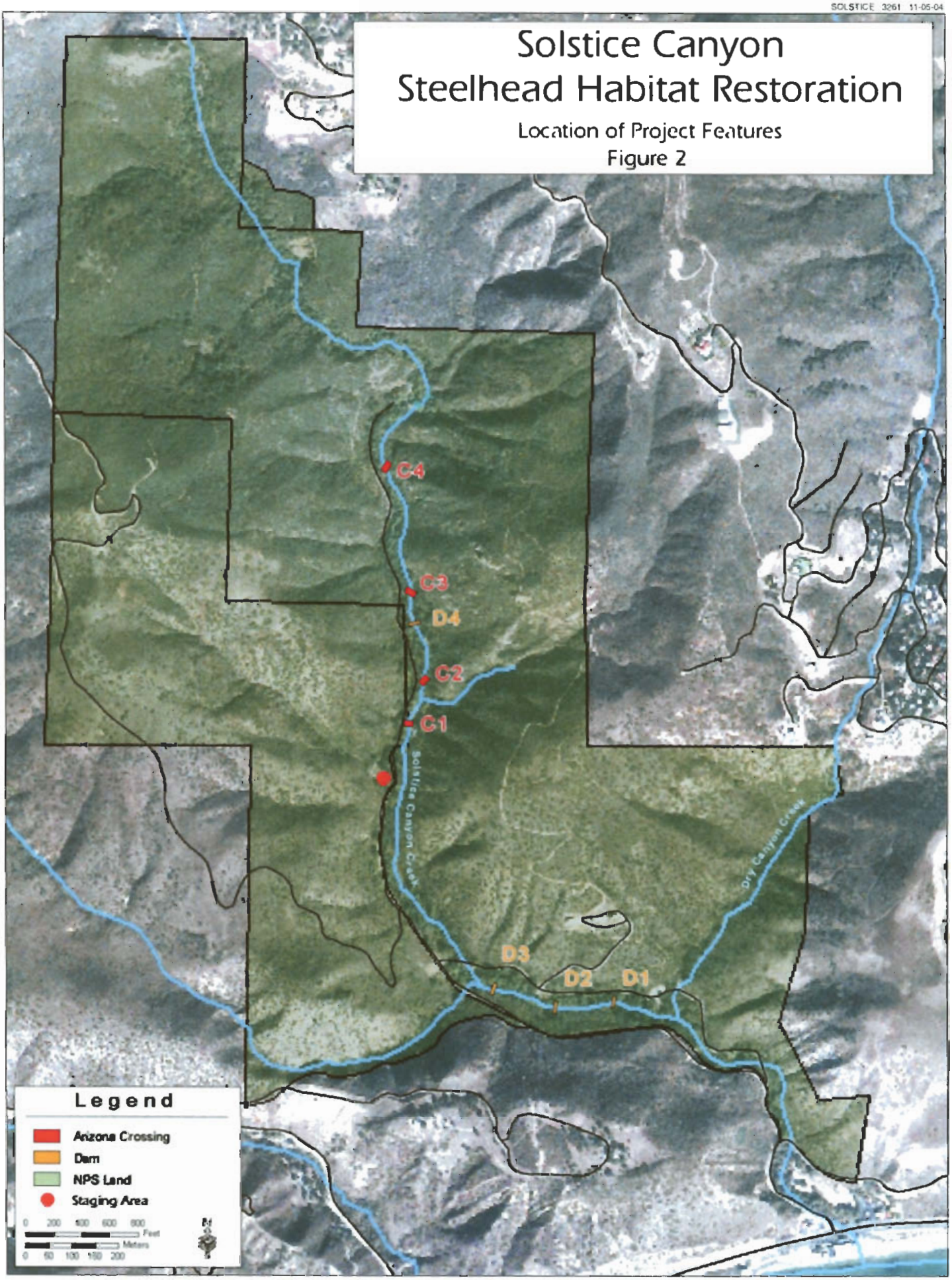


SCALE 1:400,000 1"= 6.31 miles
SOURCE: USGS QUADRANGLE MALIBU BEACH

PROJECT LOCATION MAP
SOLSTICE CANYON
Figure 1

Solstice Canyon Steelhead Habitat Restoration

Location of Project Features
Figure 2



impediments to the upstream migration of steelhead trout that prevent steelhead from spawning in the creek. Implementation of the plan would eliminate or modify migration barriers and restore habitat for steelhead.

2.2 ISSUES

The primary issue driving the actions considered in this EA is prevention of steelhead passage to suitable upstream spawning habitat by a series of check dams and Arizona crossings. To address this issue, the proposed project has been designed to remove these barriers to fish passage.

2.3 IMPACT TOPICS

2.3.1 Impact Topics Analyzed in This Document

The impacts of the Proposed Action (Preferred Action) on the following topics are presented in this EA: Soils, Noise, Biological Resources, Water Quality/Hydrology, Aesthetics, Air Quality, Historic Resources, Cultural Resources, Recreation/Visitor Experience and Transportation.

2.3.2 Impact Topics Dismissed from Further Analysis

The non-controversial topics presented below either would not be affected or would be affected negligibly by the alternatives evaluated in this EA. Therefore, these topics have been dismissed from further consideration or analysis.

2.3.2.1 Agricultural Resources

The project occurs within National Park Service land, used for recreation. No agricultural lands are associated with the park.

2.3.2.2 Energy Use

The project construction actions will not require the development of new sources of energy, nor increase energy demand.

2.3.2.3 Hazardous Materials

No hazards or hazardous materials exist in the project area, and the project will not result in the use or creation of hazardous substances that could pose public safety risks, nor will it interfere with emergency response plans.

2.3.2.4 Land Use

The proposed project only involves the elimination of man-made fish barriers. The project would not conflict with any applicable land use plan, policy or regulation of an agency with jurisdiction over it. Therefore no impacts to land use would occur.

2.3.2.5 Socioeconomics and Environmental Justice

Local and regional businesses, residents, and tourists determine the socioeconomic climate in the vicinity of the park, which is located adjacent to one of the most densely populated areas of the United States. Although park visitation exceeds 33 million people per year (NPS, 2000a), the actions evaluated in this EA/Initial Study (IS) would not affect local or regional economics or adversely affect socially or economically disadvantaged populations.

SECTION 3.0 – ALTERNATIVES

3.1 NO ACTION

Under the No Action alternative the three check dams and four Arizona crossings would remain in place. None of the actions associated with removal or partial removal of the structures would occur. These structures would continue to impede fish passage and prevent access by steelhead to suitable upstream spawning areas. The structures would continue to degrade over time and one or more of the dams might fail eventually.

3.2 ALTERNATIVE 1: COMPLETE REMOVAL OF CHECK DAMS AND ARIZONA CROSSINGS

For this alternative, Dams 1, 2, and 3 would be completely removed, and no portions of the structures would remain. Dam 4 does not need to be removed because it is not impeding fish passage. Creek side slopes at Dam 3 would be regraded to a slightly flatter angle of repose. For this alternative either no sediment would be removed behind the dams and the sediment would be permitted to move downstream after construction or part of the sediment would be removed to re-create a more natural stream grade throughout the reach. In the case of partial sediment removal a minimal volume of sediment would be removed prior to dam removal to flatten the stream grade along the reach and reduce downstream sedimentation.

Arizona crossings 2 through 4 would be completely removed. Complete removal would involve removing the concrete cap of the road crossings. Sediment below or behind the crossings would not be removed.

For Arizona Crossing Number 1 to Keller House, the road crossing would be replaced with a small bridge to allow residents to access the Keller House with vehicles. The bridge would be either a pre-fabricated structure or a flat railcar bridge. It might be oriented either perpendicular to the creek or at a slight angle to the creek planform, depending on the turning radius of the type of fire truck that would respond to emergencies at the site. No upstream sediment removal would occur, except possibly minor re-use of boulders to buttress the bridge foundations. The concrete in the bridge foundations (the abutment and wing wall) requires 30 days to cure, so the bridge would not be able to be used for this initial period after construction.

Stream access would be through a route determined by a biologist to have the least impact on riparian habitat. If any significant disturbance to habitat occurs, habitat will be restored following the completion of the barrier removal. Revegetation of any access routes from the NPS road to the creek would occur immediately after construction to discourage invasion by non-native vegetation.

3.2.1 Construction Methods

Project construction is anticipated to occur during September and October to avoid impacts to breeding sensitive species and the peak public use season. The park will be partially closed on weekdays during this period, but will remain open on weekends. All work will occur during the standard construction hours of 7:00 a.m. to 5:00 p.m., with no work occurring on weekends. Equipment will be staged at the stockpile site shown in Figure 2.

Removal of Check Dams

The removal of the check dams would take approximately two weeks with work at sites occurring simultaneously. Dam sites 1 and 2 would be dewatered together by the digging of a temporary pit in the stream bed upstream of Dam 2 to collect stream discharge, and the pumping of the water through a six-inch-diameter line using three 110-horsepower pumps to an area downstream of Dam 1. Dam 3 would

be dewatered using methods similar to those for Dams 1 and 2, but as a separate effort. No electric power is available. The total acreage to be disturbed for all sites combined is less than 2 acres, with the total quantity of material being less than 20,000 cubic yards.

Check Dam 1 (Figure 3)

This dam is constructed of stone and concrete. It has about a 9-foot drop from the spillway to the water surface in the plunge pool below, and the pool itself is about 3 feet deep. The structure has incurred moderate damage, with scour having occurred around the right edge of the spillway and additional scour at the base of the dam. This dam has the second largest volume of stored sediment of any of the barriers.

Destruction of Dam 1 would occur using a crane with a wrecking ball and bucket reaching into the site from the road south of the dam. The ball would demolish the structure, and the bucket would be used to lift debris out to the road, for truck transport to a stockpile site immediately north of the lower flat rail car bridge and/or offsite to an appropriate disposal facility. Disturbance to habitat will not occur to access the site as it is reached from above. However, there is a large alder (*Alnus rhombifolia*) directly behind the dam in the stream. This tree will be lost. Removal of the side wall also will result in the loss of some riparian vegetation.

Check Dam 2 (Figure 4)

Dam 2 is a relatively small dam with a 3-foot drop at low flow. Destruction of Dam 2 would occur using a hoe-ram, or rubber tired backhoe fitted with a hydraulic ramming device. A loader would be used to carry debris out of the channel to a truck on the road for transport to the stockpile site and/or offsite. For the alternative of partial sediment removal, minor re-grading of the channel upstream of the dam would occur using a small bulldozer, and soil would be stockpiled at the site upstream of the flat rail car bridge. Disturbance to vegetation would occur over a 10-foot wide corridor from the main access road into the site over a distance of 75 feet. The contractor would access the site via the clearest, least sensitive path to the site as determined by a project biologist. A limited number of trees may be affected including two large alders that will be lost.

Check Dam 3 (Figure 5)

Check Dam 3 is an earthen dam with a stone and concrete apron and spillway that appears to have been later retrofitted with a poured concrete spillway on top. The spillway has sidewalls and central piers constructed with slots to accommodate weir boards, probably to impound water during the dry season and allow sluicing of sediments during the high flow season. Dam 3 has about an 8-foot drop from the spillway to the water surface in the plunge pool below and the pool itself is about 2 feet deep. Dam 3 has the largest volume of stored sediment of any of the barriers.

Demolition of Dam 3 would occur using both a hoe-ram to break up the dam, and a crane and wrecking ball reaching over from the road to the north of the dam. The crane and ball would destroy structures and remove the debris out of the channel and lift it to a truck on the road for transport to the stockpile site and/or offsite. A loader would grade the channel banks to remove vertical walls and re-create a more natural stream slope. At least two mature sycamore trees (*Platanus racemosa*), may be removed along the north bank, as well as an alder on the south bank. Access to the site would disturb a corridor 10 feet wide by 100 feet long. The contractor would access the site via the clearest, least sensitive path to the site as determined by a project biologist.

Full Removal of Arizona Crossings

Removal of Arizona crossings will occur using standard earthmoving equipment, similar to that used for the removal of check dams. The dams can be removed within two weeks, while construction of the bridge at Arizona Crossing 1 may require one month.

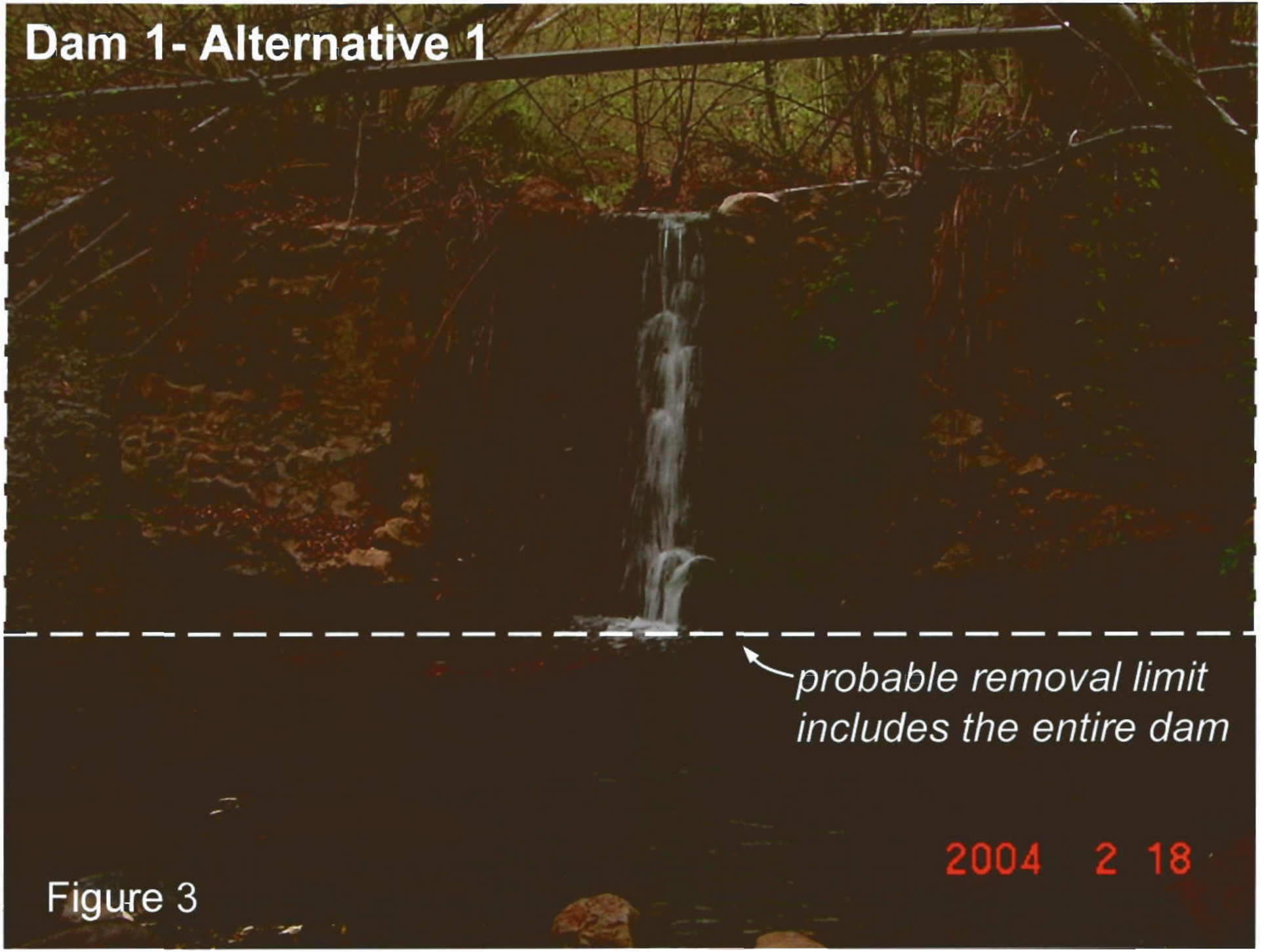

Dam 1- Alternative 1
probable removal limit
includes the entire dam
2004 2 18

Figure 3


Dam 2 - Alternative 1
probable removal limit
includes the entire dam

Figure 4

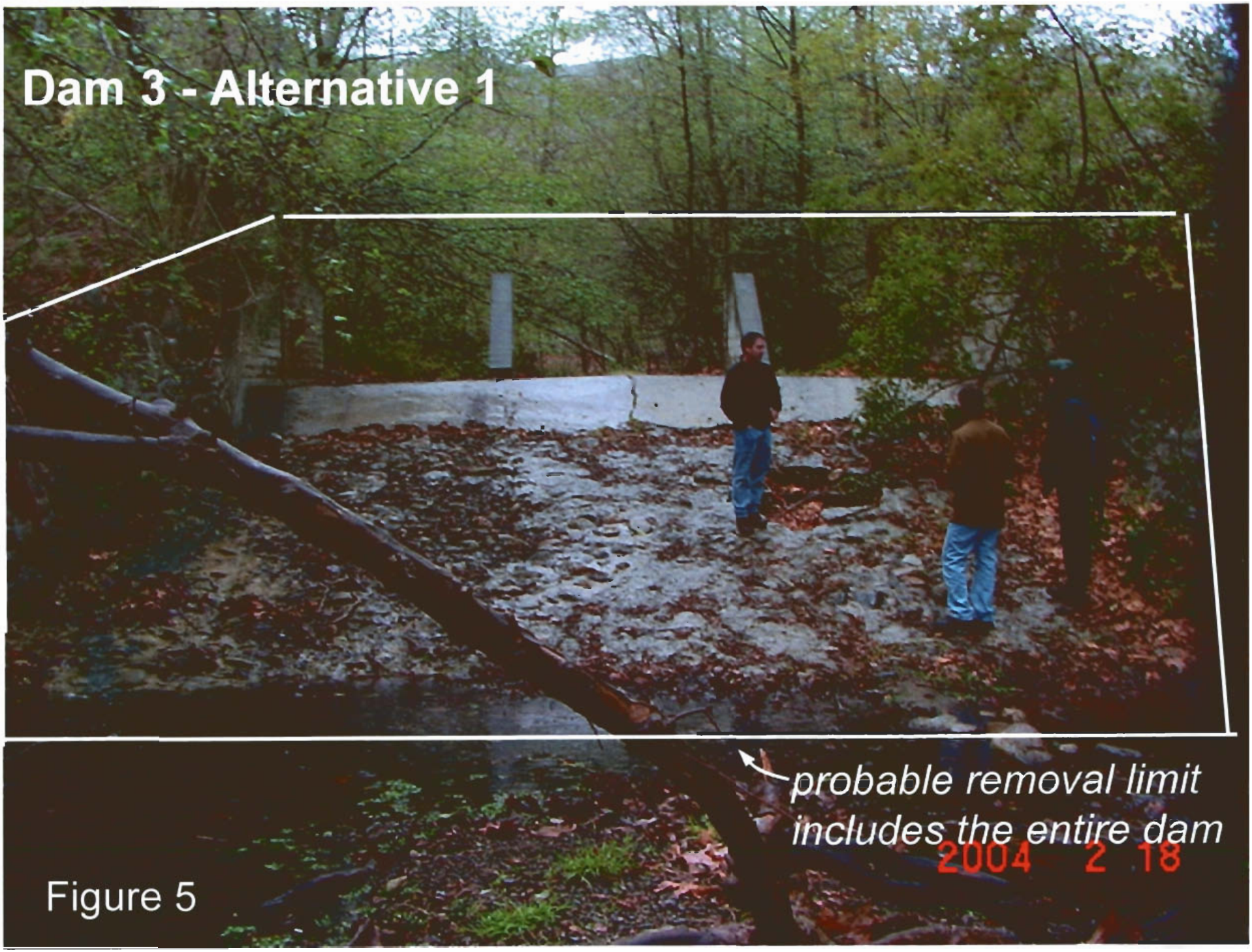

Dam 3 - Alternative 1
probable removal limit
includes the entire dam
2004 2 18

Figure 5

The Keller House Arizona Crossing 1 (Figure 6) will be demolished using a hoe-ram as described above. Debris will be removed using a wheeled loader to place it into trucks to haul it to the stockpile and/or offsite. No disturbance to native habitat will occur to access the site as it lies along the main access road. No trees will be removed.

Arizona Crossing 2 (Figure 7) will also be demolished using a hoe-ram accessing the site along the lower road, and debris will also be removed using a backhoe to lift it out of the creek and to place it into trucks to haul it to the stockpile and/or offsite. Limited disturbance to riparian habitat may occur over a distance of 100 feet. A road provides access, but trees encroach that could be slightly affected. No trees should need to be removed.

Dewatering for Arizona Crossings 1 and 2 will occur just upstream of Arizona Crossing 2. The contractor will excavate a pit and install three 110-horsepower pumps and a six-inch-diameter line at a small vacant level ground area that exists adjacent to and east of the creek. Water will be directed into the pit and through the line to a site downstream of Arizona Crossing 1.

Arizona Crossing 3 (Figure 8) will be demolished using a hoe-ram accessing the site from the upper road, and debris will also be removed using a wheeled loader to place it into trucks to haul it to the stockpile and/or offsite. This site will be dewatered by excavating a pit and installing three 110-horsepower pumps and a six-inch-diameter line. Water will be directed into the pit and pumped through the line to just downstream of this site. No disturbance will occur by equipment accessing the site and no trees will be removed, as the site is at the junction of two access roads.

Arizona Crossing 4 (Figure 9) will be demolished using jack hammers and manpower to break up the concrete. A backhoe will be used to reach down into the creek to lift out debris placed by hand into the bucket. The bucket will place the debris into a wheeled loader that will be backed up to the site along the upper road. The road between Arizona Crossings 3 and 4 may have to be widened by up to two feet along the hillside to provide sufficient clearance for the loader. It is anticipated that no trees will need to be removed, however. Replanting will occur with native vegetation at any site graded for minor road widening. Site dewatering will not need to occur due to the minor amount of work required at this site.

3.2.2 Cultural Resources

The NPS is consulting with the California State Historic Preservation Office (SHPO) for concurrence about the significance of the historic resources located in the project vicinity. In determining the Area of Potential Effect of this project, the NPS first evaluated possible impacts to historic resources in Solstice Canyon well beyond the footprint of the project. Some of these resources are the Solstice Road, the Keller House and the archaeological sites. The NPS is documenting these resources and believes they will be eligible and will therefore treat them as eligible to the National Register of Historic Places until their eligibility is formally determined. This project does not adversely affect these resources. Should presently unidentified historic resources be discovered during construction, work in that location would stop until the resources were properly evaluated under the eligibility criteria of the National Register of Historic Places. If the resources were determined to be eligible, appropriate measures would be implemented either to avoid further resource impacts or to mitigate their loss or disturbance (e.g., by data recovery excavations or other means) in consultation with the California State Historic Preservation Office.

The NPS will also consult with Chumash representatives, and copies of this environmental assessment will be provided for their review and comment. If ethnographic resources are subsequently identified, the NPS would undertake appropriate mitigation measures in consultation with Chumash groups in compliance with the various laws, regulations, and executive orders, for the proper treatment of human remains, funerary and sacred objects. The location of ethnographic sites would not be disclosed to the public.

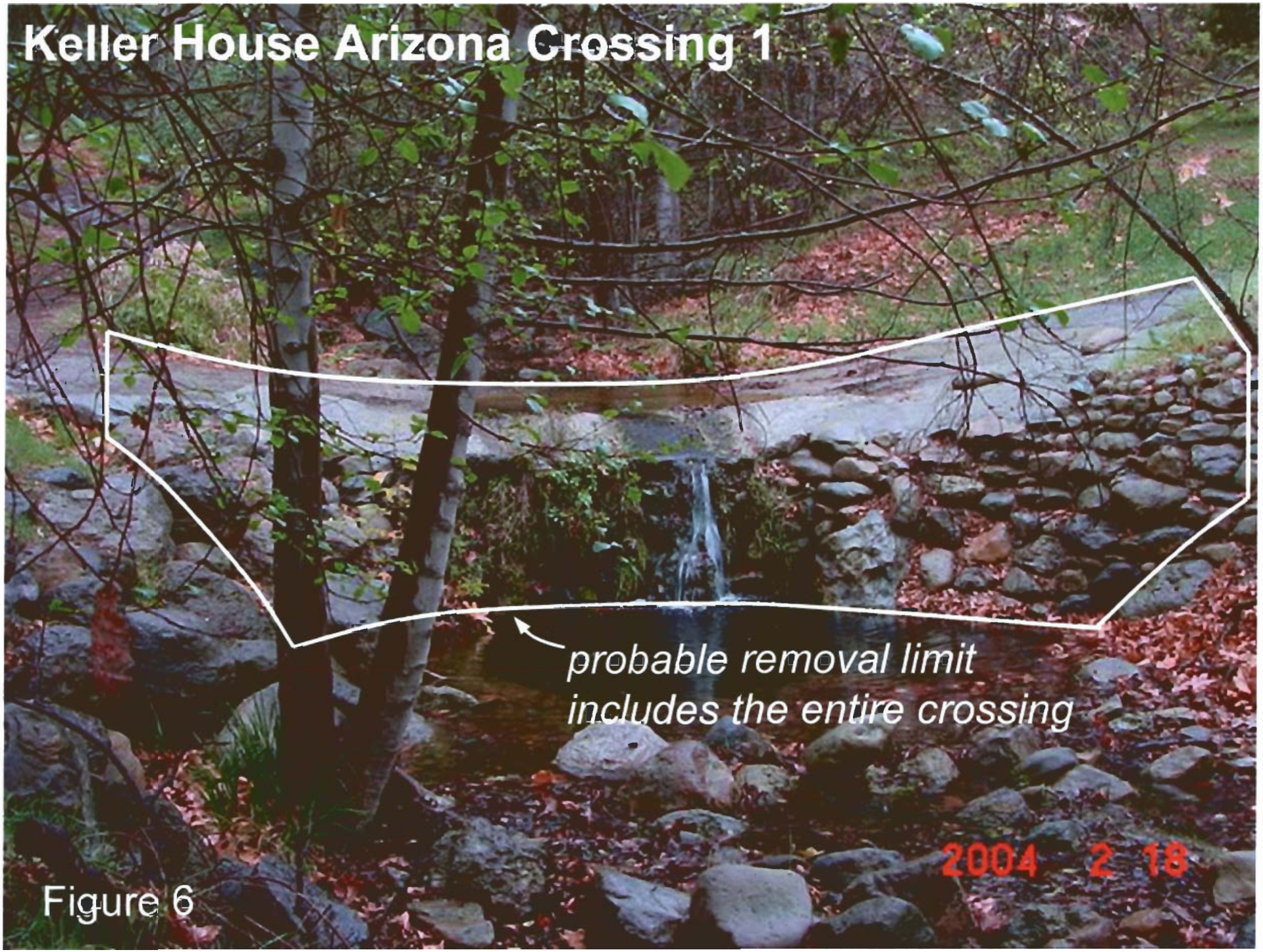

Keller House Arizona Crossing 1
probable removal limit
includes the entire crossing
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Figure 6

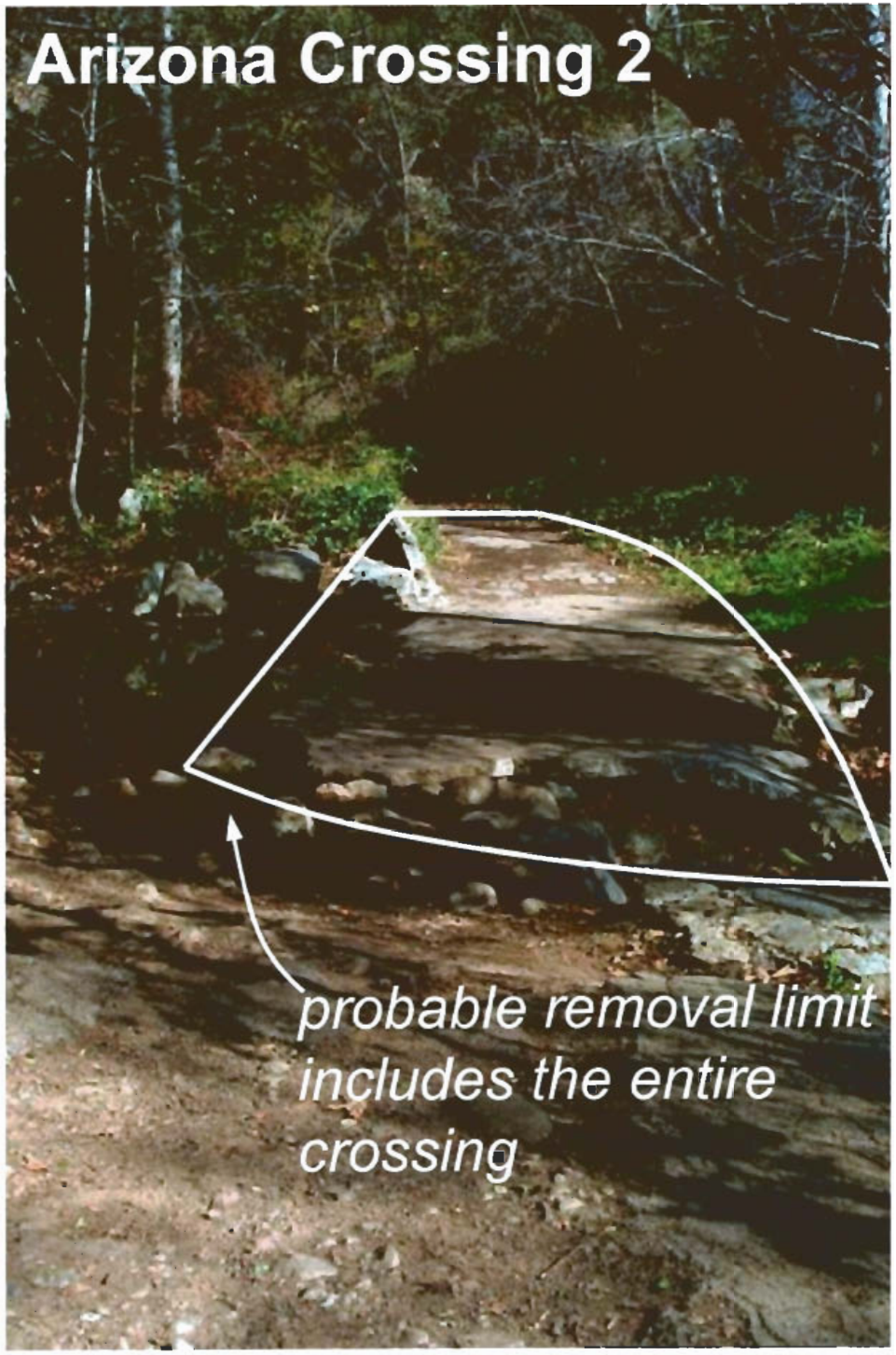
Arizona Crossing 2
probable removal limit includes the entire crossing

Figure 7


Arizona Crossing 3
probable removal limit
includes the entire
crossing
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Figure 8

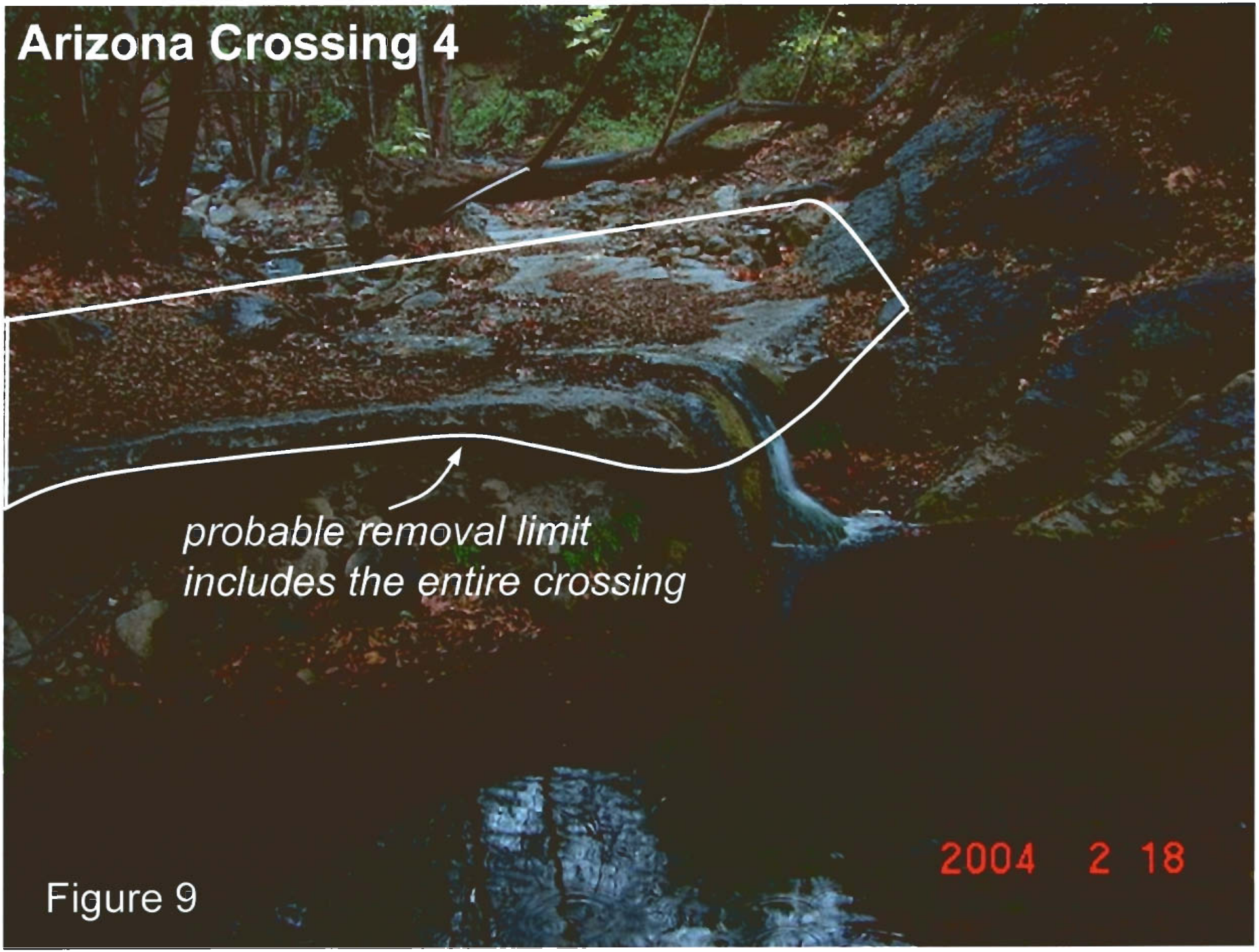
Arizona Crossing 4
probable removal limit
includes the entire crossing
2004 2 18

Figure 9

All ground disturbing activities of this project will be monitored by a professional archaeologist. The archaeological monitor has the authority to stop work until other archaeologists and specialists have been called to the site to consult on the significance of any inadvertent discoveries. The park will follow all applicable law and policy and an existing Memorandum of Agreement with the California State Historic Preservation Office to evaluate any inadvertent discoveries.

3.3 ALTERNATIVE 2: PARTIAL REMOVAL OF CHECK DAMS AND ARIZONA CROSSINGS

This alternative is the same as the Complete Removal Action above, except that a portion of the three check dams would not be removed. For partial removal, Dams 1, 2, and 3 would be removed to their grade with the creek bed, but a small portion of their side walls would be retained. The earthen side slopes above each dam would be graded back to an appropriate angle of repose. At Dams 1 and 2, approximately 2 feet of the vertical dam face would be retained along the side slope where the dam interfaces with the canyon wall. Figures 10 and 11 show the partial removal alternative for Dams 1 and 2. In addition, a large intact block portion of either Dam 1 or Dam 2 would be preserved and placed at the interpretive kiosk, along with a photograph of the dam. At Dam 3, the only remaining remnant would be the lowest 2 feet of the concrete wall on each side. Figure 12 shows the partial removal alternative for Dam 3.

Construction methods for partial removal of the check dams would be the same as described for Alternative 1. Work would occur simultaneously for all components over a 30-day period. For Alternative 2, as for Alternative 1, either sediment behind the dams would be left in place to move downstream after dam removal or a minimal amount of sediment would be removed to flatten the stream grade and placed in the stockpile area.

For Alternative 2, all Arizona crossings would be completely removed. Removal methods for the Arizona crossings would be identical to those for Alternative 1. Arizona Crossing 1 at Keller House would be replaced by a bridge to permit vehicle access for the Keller House residents.

The construction schedule would be the same as that described for Alternative 1, with work being scheduled for September and October to avoid impacts to breeding sensitive species and the peak public use season. The park will be either partially closed or entirely closed on weekdays during this period, but will remain open on weekends. Total closure would not extend longer than 30 days. All work will occur during the standard construction hours of 7:00 a.m. to 5:00 p.m., with no work occurring on weekends. Equipment will be staged at the stockpile site shown in Figure 2.

3.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

To meet the project purpose and need, which is to provide fish passage in Solstice Creek between Corral Canyon Road and the waterfall at Tropical Terrace, all barriers must be removed to the extent that fish passage could occur. Therefore, the alternatives analyzed in this EA (full and partial removal of all the barriers within the reach) are the only ones that would meet the project purpose and need. The methodology examined in this EA would accomplish the removal with minimal environmental impacts. Other removal methods such as explosives and the use of heavy equipment in the streambed were eliminated from further consideration because of the associated environmental impacts.

3.5 ENVIRONMENTALLY PREFERABLE ALTERNATIVE

In accordance with Director's Order-12, *Conservation Planning, Environmental Impact Analysis, and Decision-making*, the NPS is required to identify the "environmentally preferred alternative" in all environmental documents, including EAs. The environmentally preferred alternative is determined by applying the criteria suggested in the National Environmental Policy Act (NEPA) of 1969, which is guided

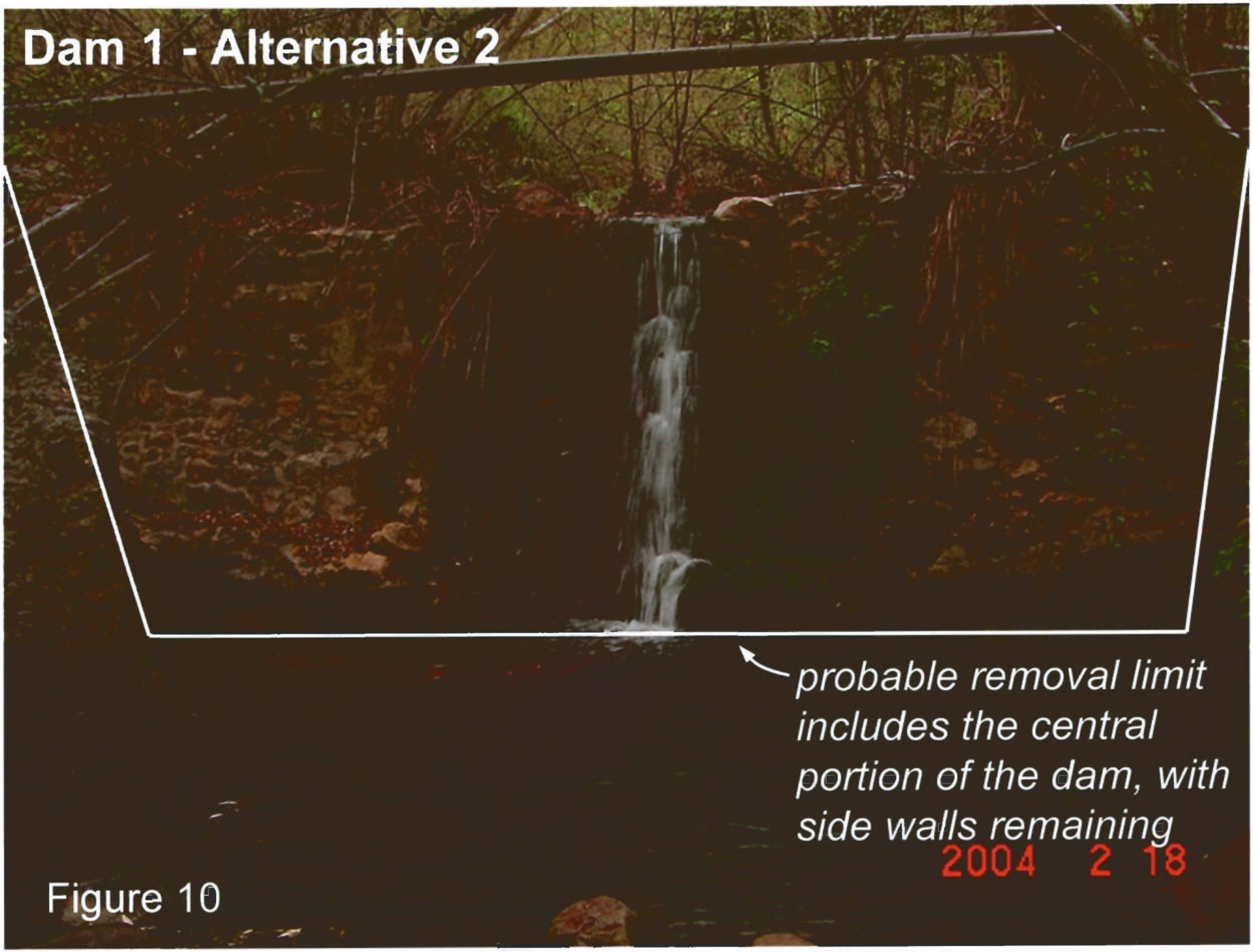
Dam 1 - Alternative 2
probable removal limit includes the central portion of the dam, with side walls remaining
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Figure 10


Dam 2 - Alternative 2
probable removal limit
includes the central portion of
the dam and not the walls

Figure 11

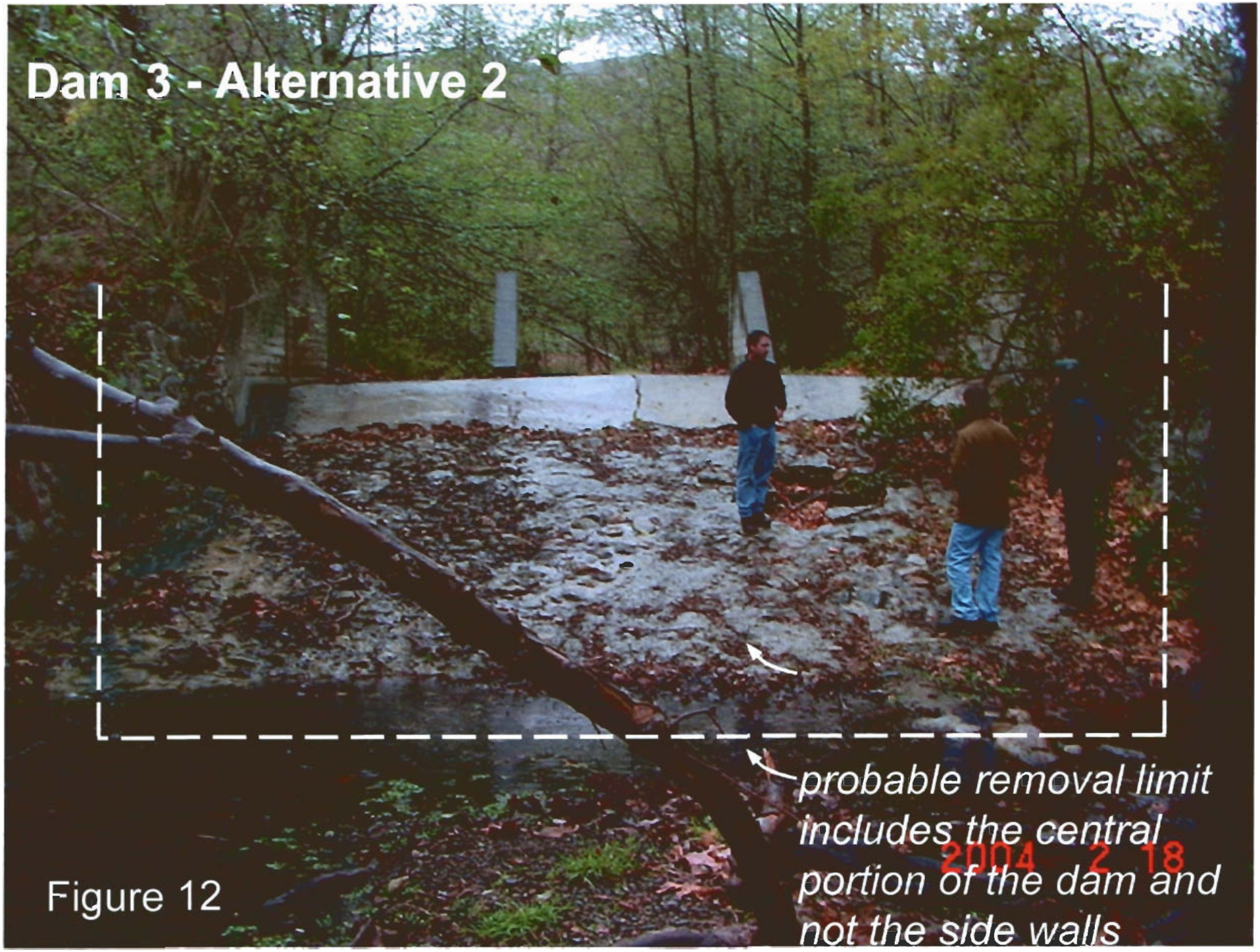

Dam 3 - Alternative 2
probable removal limit includes the central portion of the dam and not the side walls
2004 2 18

Figure 12

by the Council on Environmental Quality (CEQ). The CEQ provides direction that "[t]he environmentally preferable alternative is the alternative that will promote the national environmental policy as expressed in Section 101 of NEPA, which considers

- fulfilling the responsibilities of each generation as trustee of the environment for succeeding generations;
- assuring for all generations safe, healthful, productive, and esthetically and culturally pleasing surroundings;
- attaining the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences;
- preserving important historic, cultural and natural aspects of our national heritage and maintaining, wherever possible, an environment that supports diversity and variety of individual choice;
- achieving a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities; and
- enhancing the quality of renewable resources and approaching the maximum attainable recycling of depletable resources." (40 CFR 1500-1508)

Generally, these criteria mean the environmentally preferable alternative is the alternative that causes the least damage to the biological and physical environment and that best protects, preserves, and enhances historic, cultural, and natural resources (Federal Register, 1981).

As developed in this EA, Alternative 1, complete removal of check dams and Arizona crossings, is the preferred alternative. Both alternatives have similar environmental impacts and both would meet the project purpose and need to remove barriers to fish passage in Solstice Creek. Because complete removal of all the barriers would more fully restore the natural setting of Solstice Creek than partial removal of the check dams would, it is the environmentally preferable alternative.

SECTION 4.0 – AFFECTED ENVIRONMENT

4.1 NATURAL RESOURCES

4.1.1 Fauna

Solstice Canyon is a 550-acre park within the Santa Monica Mountains Recreation Area. Many resident and migratory species of birds and wildlife inhabit the Santa Monica Mountains Recreation Area, including 50 species of mammals, 384 species of birds, 25 species of reptiles, and up to 11 species of amphibians (NPS 2001). The Recreation Area supports a notable diversity of bird life, including raptors, shorebirds, and songbirds. Other common wildlife include coyotes, mule deer, raccoons, cottontail rabbits, ground squirrels, western fence lizards, rattlesnakes and Pacific tree frogs, as well as numerous species of insects and other invertebrates (NPS 2001).

The streambed contains habitat that is suitable for southern steelhead (*Oncorhynchus mykiss)* and other native fish species, but, because of barriers, the habitat currently does not support a fish community (Spina and Johnson 1999). It supports a diversity of aquatic insects and amphibians, including a healthy population of California newts (*Taricha torosa*) and Pacific and California treefrogs (*Hyla regilla* and *Hyla cadaverina*).

Land birds in Solstice Canyon are monitored by the MAPS (Monitoring Avian Productivity and Survivorship Program). Birds are collected in mist nets between May and August. MAPS recorded 38 species of birds in Solstice Canyon in 2001 and 37 in 2002. The species captured in the greatest numbers were song sparrows (*Melospiza melodia*) and wrentits (*Chamaea fasciata*).

Table 1 lists ten sensitive animal species that have the potential to occur in the project area. Of these, two Federal Threatened species, southern steelhead (*Oncorynchus mykiss*) and tidewater goby (*Eucyclogobius newberryi*), have no potential to occur in the project area. Steelhead are precluded from accessing Solstice Creek by the various barriers. Tidewater gobies are an estuarine species that would not occur in the Solstice Creek stream habitat. They also would be precluded from accessing the creek by the barriers.

Bank swallows (*Riparia riparia*), a State threatened species, would not be expected in the project area because its habitat, vertical banks or cliffs for nesting, does not occur in the project area. Appropriate habitat exists in the vicinity of Solstice Creek for three California Species of Special Concern, San Diego desert woodrat (*Neotoma lepida intermedia*), and southwestern pond turtle (*Clemmys marmorata pallida*), but these species have not been observed in recent surveys by the NPS (NPS 2001). However, it should be noted that no focused surveys have been conducted for the woodrat. Anecdotal evidence suggests that pond turtles may have inhabited Solstice Canyon in the past. NPS surveys of Solstice Creek and adjacent streams and canyons have not found any individuals of the federal threatened California red-legged frog (*Rana aurora draytonii*). Similarly, the federal threatened/State endangered least Bell's vireo (*Vireo bellii pusillus*) has not been recorded in Solstice Canyon, although appropriate riparian habitat occurs. Three California Species of Special Concern, coast horned lizard (*Phrynosoma coronatum*), San Diego mountain kingsnake (*Lampropeltis zonata pulchra*) and two-striped garter snake (*Thamnophis hammondi*) occur in Solstice Canyon and potentially could occur in the project area.

4.1.2 Flora

The Recreation Area supports a variety of habitats including chaparral, coastal sage scrub, coast live oak woodland, valley oak savanna, salt marsh, riparian woodland, and non-native grassland (NPS 2001). Vegetation within the Solstice Canyon project area consists mainly of riparian woodland along the Solstice Canyon streambed and coastal sage scrub on the higher elevation upland.

Table 1
Special Status Species and Critical Habitat of Potential Concern in Project Area

Common Name (Scientific Name)	Status*	Documented in Point Dume and/or Malibu Beach Quad?	Potential Presence in Project Area
Animals			
San Diego desert woodrat *(Neotoma lepida intermedia)*	CSC	Yes	**Moderate.** inhabits coastal areas with moderate to dense canopies similar to habitat in project area; no nest/middens observed by biologists visiting the project sites but no focused surveys conducted
Least Bell's vireo *(Vireo bellii pusillus)*	FT, SE	No	**Low.** has not been identified in project area or adjacent lands, but inhabits riparian areas similar to habitat in project area.
Bank swallow *(Riparia riparia)*	ST	Yes	**None.** requires vertical banks/cliffs for nesting; no such habitat in area.
Southern steelhead *(Oncorhynchus mykiss)*	FT, CSC	Yes	**None.** impediments in Solstice Creek prevent steelhead from accessing site.
Tidewater goby *(Eucyclogobius newberryi)*	FT, CSC	Yes	**None.** inhabits coastal lagoons and lower reaches of streams; no such habitat in area.
Southwestern pond turtle *(Clemmys marmorata pallida)*	CSC	Yes	**Low.** anecdotal evidence indicates this species may have inhabited Solstice Creek, although it has not been observed during recent surveys.
Coast horned lizard *(Phrynosoma coronatum)*	CSC	Yes	**Moderate.** inhabits coastal sage scrub similar to habitat in project area.
San Diego mountain kingsnake *(Lampropeltis zonata pulchra)*	CSC	Yes	**Moderate.** inhabits riparian and scrub similar to habitat in project area.
Two-striped garter snake *(Thamnophis hammondii)*	CSC	Yes	**Low.** NPS has not observed species in Solstice Canyon, although suitable habitat is present along creek.
California red-legged frog *(Rana aurora draytonii)*	FT	No	**Low.** surveys of project area and adjacent streams/canyons have not discovered species.
California red-legged frog critical habitat	CH	Yes	**None.** Although other areas within the Recreation Area have been designated as critical habitat for the California red-legged frog, Solstice Canyon is not included within those areas (see "map unit 29" in USFWS, 2001).
Plants			
Malibu baccharis *(Baccharis malibuensis)*	CSC	Yes	**Low.** Requires volcanic substrates not present in project area; also not discovered during survey of project area.
Santa Susana tarweed *(Deinandra minthornii)*	Rare	Yes	Documented in project area. Three plants are present immediately north of the rock retaining wall that borders northern edge of parking lot.

Table 1 (continued)
Special Status Species and Critical Habitat of Potential Concern in Project Area

Common Name (Scientific Name)	Status*	Documented in Point Dume and/or Malibu Beach Quad?	Potential Presence in Project Area
Lyon's pentachaeta *(Pentachaeta lyonii)*	FE, SE	Yes	**None.** Requires grasslands/chaparral not present in project area; also not discovered during survey of project area.
Coulter's saltbush *(Atriplex coulteri)*	CSC	Yes	**None.** Requires coastal bluffs not present in project area; also not discovered during survey of project area.
Blochman's dudleya *(Dudleya blochmaniae* ssp. *blochmaniae)*	CSC	Yes	**None.** Requires open, rocky slopes over serpentine soils not present in project area; also not discovered during survey of project area.
Marcescent dudleya *(Dudleya cymosa* ssp. *marcescens)*	FT, Rare	Yes	**None.** Requires rock surfaces and/or rocky volcanic cliffs not present in project area; also not discovered during survey of project area.
Santa Monica Mountains dudleya *(Dudleya cymosa* ssp. *ovatifolia)*	FT, CSC	Yes	**None.** Requires rocky outcrops and/or volcanic cliffs not present in project area; also not discovered during survey of project area.
Braunton's milkvetch *(Astragalus brauntonii)*	FE, CSC	Yes	**None.** Inhabits disturbed areas in chaparral (Hickman 1993) overlying granite or limestone not present in project area; also not discovered during survey of project area.
Parry's spineflower *(Chorizanthe parryi* var. *parryi)*	CSC	Yes	**Low.** NPS has not observed species in Solstice Canyon, and project area is below typical elevational range for species (Hickman 1993); however, suitable coastal scrub habitat exists in area.
Plummer's mariposa lily *(Calochortus plummerae)*	CSC	Yes	**Low.** NPS has not observed species in Solstice Canyon, although suitable coastal scrub habitat exists in area.
Sonoran maiden fern *(Thelypteris puberula* var. *sonorensis)*	CSC	Yes	**Low.** NPS has not observed species in Solstice Canyon, and project area is below typical elevational range for species (Hickman 1993); however, suitable riparian habitat exists in area.

***Status key:**
CH = federally designated critical habitat
CSC = California Species of Special Concern
FE = federally listed as endangered
FT = federally listed as threatened
Rare = state listed as rare
SE = state listed as endangered
ST = state listed as threatened

The approximately 10 feet wide low flow channel of the Solstice Creek is characterized by unvegetated open water with a riparian cover dominated by white alder (*Alnus rhombifolia*), California laurel (*Umbellularia californica*), western sycamore (*Platanus racemosa*), and arroyo willow (*Salix lasiolepis*). Typical wetland plants along the edge of the creek include southern cattail (*Typha domingensis)*, giant horsetail (*Equisetum telmateia*), and various rushes such as *Juncus xiphioides* and *Juncus macrophyllus*.

Common understory species along the creek are coyote brush (*Baccharis pilularis*), mule fat (*Baccharis salicifolia*), California blackberry (*Rubus ursinus*), and mugwort (*Artemisia douglasii*). Additionally, the regionally uncommon leather root (*Hoita machrostachya*), Durango root (*Datisca glomerata*) and Plummer's baccharis (*Baccharis plummerae* ssp. *plummerae*), a California Native Plant Society (CNPS) List 4 species, occur in several locations along the creek (NPS field survey, July 2004).

The creek bank transitions abruptly to uplands dominated on the lower slopes by stands of southern oak (*Quercus agrifolia*) and patches of California black walnut (*Juglans californica*), both with an understory of California blackberry and poison oak (*Toxicodendron californica*). On the higher, north facing slopes, the riparian woodland gives way to a mosaic of California black walnut and laurel sumac (*Malosma laurina*) intermixed with coastal sage scrub dominated by purple sage (*Salvia leucophylla*), California sagebrush (*Artemisia californica*), sticky monkey flower (*Mimulus aurantiacus*), and giant wild rye (*Leymus condensatus*). The southerly facing slopes of the canyon are dominated by laurel sumac and bush mallow (*Malacothamnus fasciculatus*) transitioning to black sage (*Salvia mellifera*) and ashy leaved buckwheat (*Eriogonum cinereum)* interspersed with foothill needlegrass (*Nassella lepida*).

The major non-native species occurring in the Solstice Canyon riparian corridor are umbrella plant (*Cyperus involucratus*), poison hemlock (*Conium maculatum*), spurge (*Euphorbia terracina*), fennel (*Foeniculum vulgar*), and castor bean (*Ricinus communis*).

Appendix A lists the species occurring at the dam and Arizona crossing locations.

Table 1 lists sensitive species that potentially could occur in the project area. This table includes information from sensitive species surveys performed by NPS in 2001 for the previous removal of a stream crossing and parking lot expansion (NPS 2001) and from a survey for this project performed in July 2004.

A total of 11 sensitive plant species have been documented in the Point Dume/Malibu Beach area (NPS 2001). Most of these species have not been observed in Solstice Canyon and have little potential to occur in the project area due to lack of suitable habitat.

During the surveys for the parking lot expansion, three individuals of Santa Susana tarweed (*Deinandra minthornii*), listed as Rare by the State of California, were observed north of the retaining wall that borders the northern edge of the parking lot (NPS 2001). NPS believes this species was introduced to Solstice Canyon by the CNPS while trying to create an outdoor nursery in the canyon (J. Tiszler, NPS, personal communication, July 7, 2004). The riparian habitat in the project area is unlikely to support this species.

A single individual of Malibu baccharis (*Baccharis malibuensis*), a California Species of Special Concern, has been reported by reliable sources to occur in Solstice Canyon. NPS personnel have looked for it and failed to find it (J. Tiszler, NPS, personal communication, July 7, 2004). The reported sighting is well outside the project area. The species was not observed in the project area in a July 2004 survey.

4.1.3 Surface Water Bodies

Solstice Creek is a spring-fed stream that drains about 4.4 square miles of steep terrain in the Santa Monica Mountains (Klein et al. 2002). Solstice Creek is fairly steep, with gradients in the project area downstream of Tropical Terrace that range from 2 to 6 percent and average about 4 percent. Bed material consists of a wide range of particle sizes, from small sand deposits to large boulders. A study of sediments stored behind the barriers determined that a representative distribution of sediment size was approximately 40% boulders, 30% cobbles, 10% gravel, and 20% fines (Roche and Kearns 2002). Episodic, large-magnitude mud and debris flows that occur in response to wildfire are a dominant geomorphic process in the area. Solstice Creek is subject to alternating cycles of massive sediment transport and deposition followed by periods of fluvial reworking and scour (Klein et al. 2002).

Water quality in Solstice Creek is generally good but varies seasonally (NPS 2001). Most of the Solstice Creek watershed above the Pacific Coast Highway is undeveloped. Seven structures currently exist in

the canyon. All of these are owned and maintained by NPS. Due to the absence of residential and urban development in Solstice Canyon, the stream is relatively free of herbicides, fertilizers, and other pollutants common to other drainages in the Santa Monica Mountains.

Water quality in Solstice Creek is most strongly affected by seasonal storms that greatly increase the volume of flow in the creek (NPS 2001). These heavy flows associated with seasonal storms mobilize sediments and debris in the creek. During these storm flows, turbidity in Solstice Creek is elevated and water quality is temporally reduced.

4.1.4 Soils

The main soil association throughout Solstice Canyon is the Chumash-Boades-Malibu Association; the canyon bottom supports a Fluvaquents-Riverwash complex (US DOI, NPS 2001). The Chumash-Boades-Malibu Association is derived from shale and sandstone rock sources. Although the characteristics vary by soil type, typical soil profiles include upper horizons of brown loam (yellowish brown gravelly loam in the case of Chumash soil) underlain by fractured, bedded shale at depths of seven to 27 inches. Malibu soil supports an intermediate layer of reddish brown clay at typical depths ranging from 19 to 27 inches. Volcanic, rock outcrops form common inclusions in this association.

Fluvaquents in the project area consist of very deep, very poorly drained soils that formed in alluvium on low floodplains. The topmost horizon in fluvaquents-riverwash typically supports a litter of leaves and twigs underlain by grayish brown loam. The loam layer transitions into sandy loam underlain by extremely gravelly sand on top of gravelly coarse sand at a depth of 48 to 55 inches.

4.2 CULTURAL RESOURCES

4.2.1 Laws, Regulations, and Policies

Numerous legislative acts, regulations, and NPS policies provide direction for the protection, preservation, and management of cultural resources on public lands. Further, these laws and policies establish what must be considered in general management planning and how cultural resources must be managed in future undertakings resulting from the approved plan regardless of the final alternative chosen. Applicable laws and regulations include the NPS Organic Act (1916), the Antiquities Act of 1906, the National Historic Preservation Act of 1966 (1992, as amended), the National Environmental Policy Act of 1969, the National Parks and Recreation Act of 1978, the Archaeological Resources Protection Act of 1979, the Native American Graves Protection and Repatriation Act of 1990, and the Curation of Federally Owned and Administered Archaeological Collections (1991).

Applicable agency policies relevant to cultural resources include Chapter 5 of NPS *Management Policies*, and the *Cultural Resource Management Guideline (DO-28)*, as well as other related policy directives such as the NPS *Museum Handbook*, the NPS *Manual for Museums*, and *Interpretation and Visitor Services Guidelines (NPS-26)*.

4.2.2 Overview

The Chumash Native American Indian group occupied Solstice Canyon, and Loxostoxni was a major Chumash village located at the mouth of Solstice Canyon. It functioned as a traditional Chumash village until about 1800 and is now represented by a series of functionally related archaeological sites beginning at the coast and continuing up Solstice Creek to the area of the Keller House.

Lower Solstice Canyon was once part of the vast Rancho Topanga Malibu Sequit. The rancho was first granted to Jose Bartolome Tapia in 1805. Eventually ownership of the rancho passed to Matthew Keller, who, like the rancho owners before him, stocked his land with cattle and built a house in Malibu Canyon. Keller's son Henry inherited the rancho but eventually sold it to Frederick and May K. Rindge in 1892.

However, Henry Keller was so fond of Solstice Canyon that, after he sold the rancho, he purchased a squatter's cabin in Solstice Canyon. The "Keller House," as it is still referred to today, was used as a hunting lodge by the family until the 1930s. By this time the Rindge family was under heavy financial pressure to break up the rancho, and individual parcels of land were sold off.

In 1937, Fred and Florence Roberts purchased their first parcel in Solstice Canyon and constructed a log cabin along the creek, with a barn, pool, and a dam in the creek. By 1947 the Roberts owned the majority of Solstice Canyon from the source spring of the stream to Malibu Road near the coast. They built a house in 1952 after deciding to live in the canyon full time.

After Fred Roberts passed away in 1976, the ranch was not cared for as it had been while he was alive. In 1982, a disastrous fire swept through the canyon, destroying the house, several other structures, and acres of vegetation in the canyon.

Potential National Register Eligibility: Owner of a regional chain of grocery stores and liquor stores, Fred Roberts would be locally significant in Malibu and Santa Monica for his marketing ingenuity, his philanthropy, and role in the community. However, his Solstice ranch and home are not fundamentally linked to his business success. The ranch landscape associated with the Roberts period is represented by fragments. The 1982 fire and 1983 flood, and subsequent neglect leave little to use to visualize the ranch landscape. The main house, barns, corrals, fences and other landscape features were destroyed and are now overgrown with natural vegetation. Some of the remaining visible features of the ranching landscape are Keller House, the Solstice Road alignment, the hardened Arizona crossings in and attaching to the road, and the dams in the creek.

4.2.3 Historic Resources

Solstice Road may have been the first and was certainly among the first of three lateral roads—the others being Malibu and Los Aliso (Decker)—developed off the Malibu trail, which, at the time (c. 1895), mostly followed the wet sand on the beach. There is evidence that Solstice Road was graded in 1894 and was in use by 1886. The road appears on a U.S. Geographic Survey (USGS) 15' topographic map published in 1903. The alignment has not changed over time because of the steep walls of the canyon. Although the National Register eligibility of the road has not been formally evaluated, the alignment would appear to be the primary character-defining feature meriting preservation consideration. We believe we already have sufficient information to assume that the Solstice Road alignment is potentially eligible to the National Register of Historic Places and expect to nominate it as part of the forthcoming Historic Resources Study. In the meantime, we assume that the Solstice Road alignment is eligible.

Two of the hardened Arizona crossings proposed for removal (Arizona Crossings 2 and 3) were installed at wet crossings in the Solstice Road alignment in about 1947 by Fred Roberts, the property owner at the time. The wet crossings are shown on the 1903 USGS 15' topographic map. Then subsequently (probably in 1950), Roberts constructed a bypass road past the Arizona crossings. This is the access road used currently. The Arizona crossings were severely damaged in the 1983 floods and are currently not usable. Removal of the damaged crossings and restoration of wet crossings would restore the road to its historic condition from 1886 to 1947 and not have an adverse effect on the road alignment or character.

Two of the hardened Arizona crossings proposed for removal cannot be dated with certainty. Crossing 1 is a lateral to the "Keller" House. Keller used this structure as a hunting cabin until the 1930s and there was apparently no streambed crossing during this time. The Roberts put in a hardened Arizona crossing—possibly about 1947 when they first acquired the property. This crossing was severely damaged in the 1982 fire and 1983 floods and was replaced in 1988 by the Santa Monica Mountains Conservancy. This crossing is not considered historic or significant and replacing it with a bridge will not have an adverse effect on Solstice Road. The new bridge will not affect the Keller House and will be closer to the historic setting.

Another lateral Arizona crossing (Arizona Crossing 4) led to the barn near the main house. This crossing was not shown on a map of ranch roads dating to about 1960, so it apparently did not exist at that time. This crossing is not considered to be historic. Additionally, it was completely destroyed in the 1983 floods. The access road in and out of the stream is barely detectable now. Large concrete slabs scattered downstream are remnants of the concrete from the crossing.

Between 1938 and 1947, Roberts apparently installed the three dams now proposed for removal in Solstice Creek. Although these dams are associated with the Roberts era in Solstice Canyon from about 1938, the ranching landscape of the Roberts era now lacks integrity. The house, barns, corrals, many associated structures, and fences were destroyed during fire in 1982, flood in 1983, and subsequent neglect and inappropriate management. The dams to be removed represent mid-20th century fragments of the Roberts era but do not, by themselves, have inherent technical or esthetic merit. The dams are reported to have quickly filled with silt and became nonfunctional. Dam 3 used wood gates to control the pond level but these gates burned in the 1982 fire. The dams have lost integrity and no longer function as designed. These structures are no longer reflective of any historic significance of the Roberts period.

4.2.4 Archaeological Resources

Within the Area of Potential Effect there are two small archaeological sites near the road that were discovered during monitoring for an earlier rehabilitation project. They will not be affected by the dam and crossing removal actions. It is possible that displaced archaeological artifacts may be trapped in the sediments behind the dams but these artifacts will lack provenance. In spite of extensive archaeological surveying, there are no known archaeological sites at the locations of ground disturbance. However, it is possible that intact archaeological deposits may be encountered in the stream banks that will be exposed as a result of removing dams or crossings. Because of this potential, professional archaeologists will monitor all ground disturbances. Procedures to be followed in the event of inadvertent discoveries are defined in a Memorandum of Agreement between NPS and the California State Historic Preservation Office that is in place from the previous rehabilitation project.

4.3 VISITOR EXPERIENCE

4.3.1 Recreation

The Santa Monica Mountains Conservancy opened Solstice Canyon as a public park in 1988. The National Park Service acquired the park in 1997. Each year more than 33 million visitors enjoy the greater recreation area composed of the beaches and the mountains. In 2003, there were 36,375 vehicles that accessed the park, equating to approximately 90,940 patrons (assuming 2.5 persons per car). In addition, people walk in from outside the park, having parked at the beach or other areas. Thus, approximately 7,500 people may access the park in a one-month period.

The park is highlighted by more than 20 miles of trails from the parking lot in Solstice Canyon. Other activity locations include a small picnic area between the parking lot and Solstice Creek east of the visitor station. Restroom facilities are available at the parking lot. Overnight camping is not permitted in the project area. Hours of operation are generally from 8:00 a.m. to sunset. However, this applies only to parking, and park users are sometimes found in the park between sunset and 8:00 a.m. Bicycles are limited to the paved road that runs through the middle of the park, and also serves as a service road. The project components are all located near this roadway which generally follows the creek.

4.3.2 Visual Resources

The Solstice Canyon recreation area supports a variety of habitats visually dominated by chaparral and coastal sage scrub. Structures are located in the project area that visually detract from the otherwise pristine nature setting. Such structures include the visitor center, restrooms, and parking lot which can be seen from trails along higher elevations. Private residences located in the urban communities abut the project boundary and can be seen from numerous locations within the park.

Solstice Creek is a low-flow channel that meanders through the center of the park. The approximately 10-foot-wide channel supports a mix of wetland plants, woody and herbaceous vegetation along its borders. A 25-foot-wide channel runs through the Arizona crossing portion of the project area. The project areas are near the road that provides vehicular access through the park; however, the creek is at a lower elevation than the road, and the road is not in the viewshed of the individual areas where fish barriers are proposed for removal.

4.4 AIR QUALITY

Solstice Creek is located within Source/Receptor Area (SRA) 2 (Northwest Coastal Los Angeles County). This SRA is one of 38 designated areas under South Coast Air Quality Management District (SCAQMD) jurisdiction. The communities within a given SRA are expected to have similar climatology. Additionally, similar traffic levels and the presence of local point sources contribute emissions to these areas. Subsequently, similar ambient air pollutant concentrations are expected within any given SRA. Unfortunately, monitoring within SRA 2 does not monitor fine particulate matter. The Southwest Coastal Los Angeles County monitoring station located to the southeast (SRA 3) is the next nearest monitoring station and would be most representative of local pollutant concentrations. The most current five years of data monitored at these stations are included in Table 2. The data indicate that the area is sensitive to both ozone and PM_{10}, as these State standards are violated on a fairly regular basis. Additionally, note that the federal ozone standard was exceeded in 2003.

4.4.1 Sensitive Receptors

Some land uses are considered more sensitive to air pollution than others due to the types of population groups or activities involved. Sensitive population groups include children, the elderly, the acutely ill, and the chronically ill, especially those with cardio-respiratory diseases.

Residential areas are also considered to be sensitive to air pollution because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to any pollutants present. Active recreational land uses are considered moderately sensitive to air pollution. Although exposure periods are generally short, exercise places a high demand on respiratory functions, which can be impaired by air pollution. In addition, noticeable air pollution can detract from the enjoyment of recreation. Industrial and commercial areas are considered the least sensitive to air pollution. Exposure periods are relatively short and intermittent, as the majority of the workers tend to stay indoors most of the time. In addition, the working population is generally the healthiest segment of the public.

The dams and crossings to be removed are located within the Santa Monica Mountains Recreational Area. With the exception of the Keller House, which provides lodging for park personnel, no residents or sensitive land uses are located proximate to any of the seven structures to be removed. Furthermore, vehicular access to the park would be partially or fully closed during demolition activities.

Table 2
Ambient Air Quality Monitoring Summary,
Northwest Coastal Los Angeles/Southwest Coastal Los Angeles Monitoring Stations[1]

Pollutant/Standard	Number of Days Threshold Were Exceeded and Maximum Levels During Such Violations				
	1999	2000	2001	2002	2003
Ozone					
State 1-Hour ≥ 0.09 ppm	4	2	1	1	11
Federal 1-Hour > 0.12 ppm	0	0	0	0	1
Federal 8-Hour > 0.08 ppm	0	0	0	0	1
Max. 1-Hour Conc. (ppm)	0.117	0.104	0.099	0.118	0.134
Max. 8-Hour Conc. (ppm)	0.082	0.079	0.080	0.077	0.104
Carbon Monoxide					
State 8-Hour > 9.0 ppm	0	0	0	0	0
Federal 8-Hour ≥ 9.5 ppm	0	0	0	0	0
Max. 8-Hour Conc. (ppm)	3.59	4.31	4.00	2.73	2.79
Nitrogen Dioxide					
State 1-Hour ≥ 0.25 ppm	0	0	0	0	0
Max. 1-Hour Conc. (ppm)	0.133	0.162	0.109	0.113	0.119
Inhalable Particulates (PM_{10})					
State 24-Hour > 50 $\mu g/m^3$	6	9	8	12	3
Federal 24-Hour > 150 $\mu g/m^3$	0	0	0	0	0
Max. 24-Hour Conc. ($\mu g/m^3$)	69.0	74	75	121	58

[1] Ozone, carbon monoxide, and nitrogen dioxide are as monitored at the Northwest Coastal Los Angeles County station. Particulate matter is as monitored at the Southwest Coastal Los Angeles County station.
ppm: parts per million; $\mu g/m^3$: micrograms per cubic meter
Source: California Air Resources Board

4.5 NOISE

The project area is located in an isolated approximately one-mile-long canyon, 1,000 feet north of Pacific Coast Highway. With the exception of the onsite Keller House, which provides lodging for park personnel, the nearest inhabited house is approximately 500 feet south of the entrance gate at Pacific Coast Highway. Other houses abut the edge of the park boundary; the nearest of these is more than ½ mile from the individual project elements.

The dominant noise sources in the park are park visitors and the vehicular traffic, most dominant near the visitor center. Otherwise, the park is characterized by natural sounds of wind and wildlife. The draft general management plan prepared by NPS in 2000 projected most areas of the park at 50 decibels (dBs).

While no noise measurements were obtained at the project sites, past noise measurements obtained on July 22, 2003 for the renovation of the Santa Ynez Reservoir, located in Topanga State Park to the east, would be representative of uninhabited forest area. Noise measurements obtained near the Santa Ynez

Reservoir ranged from the low to high 40's dBA Leq depending upon the proximity to Palisades Drive. Based on the fact that no major roadways are located along Solstice Creek in the vicinity of the proposed demolition, onsite noise levels would be in the low 40's dBA.

4.6 TRANSPORTATION/TRAFFIC

A paved road runs through the middle of the park, following along the creek. Bicyclists also use this roadway. Carpooling is encouraged, as parking is limited. In 2003, there were 36,375 vehicles that accessed the park. Additional people park at the beach outside of the park and walk in; thus actual visitation numbers are higher (J. Bray, NPS, Public Affairs Officer). Parking lot space is limited, and during heavy use periods, visitors often park on the roadway shoulders inside and outside of the park, or at the beach.

SECTION 5.0 – ENVIRONMENTAL CONSEQUENCES

The National Environmental Policy Act (NEPA) requires that environmental documents disclose the environmental impacts of the proposed federal action, reasonable alternatives to that action, and any adverse environmental effects that cannot be avoided should the Proposed Action be implemented. This section analyzes the environmental impacts of the two alternatives and provides for the basis for comparison of the alternatives. The NEPA requires consideration of context, intensity and duration of impacts, indirect impacts, cumulative impacts, and measures to mitigate for impacts.

5.1 METHODOLOGY

5.1.1 General Definitions

5.1.1.1 Context

Context is the setting within which an impact is analyzed, such as the affected region, society as a whole, the affected interests, and/or a locality. The intensity of impacts is evaluated within a local (i.e., project area) context, while the intensity of contribution of effects to cumulative impacts is evaluated in a regional (i.e., park-wide context).

5.1.1.2 Intensity

Intensity is a measure of the severity of an impact. The intensity of an impact may be:

- *Negligible*, when the impact is localized and not measurable or at the lowest level of detection;
- *Minor*, when the impact is localized and slight but detectable;
- *Moderate*, when the impact is readily apparent and appreciable, or
- *Major*, when the impact is severely adverse and highly noticeable.

5.1.1.3 Duration

Duration is a measure of the time period over which the effects of an impact persist. The duration of impacts may be

- *Short-term*, when impacts occur only during construction or last less than one year; or
- *Long-term*, when impact last one year or longer.

5.1.1.4 Cumulative Impacts

Cumulative impacts are impacts on the environment that result from the incremental (i.e., additive) impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of who undertakes such actions. Cumulative projects can result from individually minor but collectively significant actions taking place over a period of time.

5.1.1.5 Biological Resources

In accordance with language used to determine effects on threatened and endangered species under the federal Endangered Species Act, potential effects are considered as follows:

- *No effect*, when the proposed actions would not affect special status species or critical habitat;
- *Not likely to adversely affect*, when effects on special status species are discountable (i.e., extremely unlikely to occur and not able to be meaningfully measured, detected, or evaluated) or completely beneficial; or
- *Likely to adversely affect*, when any adverse effect to listed species may occur as a direct or indirect result of proposed actions and the effect is not discountable or completely beneficial.

5.1.1.6 Cultural Resources

Impacts on cultural resources were developed based on existing conditions, current regulations, and likely development trends. The inventory of archaeological resources in the park is incomplete. For purposes of assessing impacts, all unrecorded resources are considered potentially eligible for listing on the National Register of Historic Places.

The park's inventory of standing structures and cultural landscapes is incomplete and many structures and landscapes still require evaluation to determine their eligibility for listing on the National Register of Historic Places. For purposes of assessing potential impacts to these properties, unevaluated structures and landscapes are assumed to be potentially eligible.

The assessment of impacts on cultural resources and historic properties was made in accordance with regulations of the Advisory Council on Historic Preservation (36 CFR 800) implementing Section 106 of the National Historic Preservation Act. Cultural resources were identified within these areas that are either listed in or eligible for listing in the National Register of Historic Places. An assessment was made of the nature and extent of effects on cultural resources anticipated from implementing proposed undertakings. Cultural resources can be affected by actions that alter in any way the attributes that qualify the resources for inclusion in the National Register. Adverse effects can result when the integrity of a resource's significant characteristics is diminished. Consideration was given to both the effects anticipated at the same time and place of the undertaking, and indirect effects, potentially occurring at a later time or away from the project site. This analysis led to the map of the Area of Potential Effect (Figure 13).

Under section 106, only historic resources that are potentially eligible or are listed on the National Register of Historic Places are considered for impacts. An impact, or effect, to a property occurs if a proposed action would alter in any way the characteristics that qualify it for inclusion on the register. If the proposed action would diminish the integrity of any of these characteristics, it is considered to be an adverse effect.

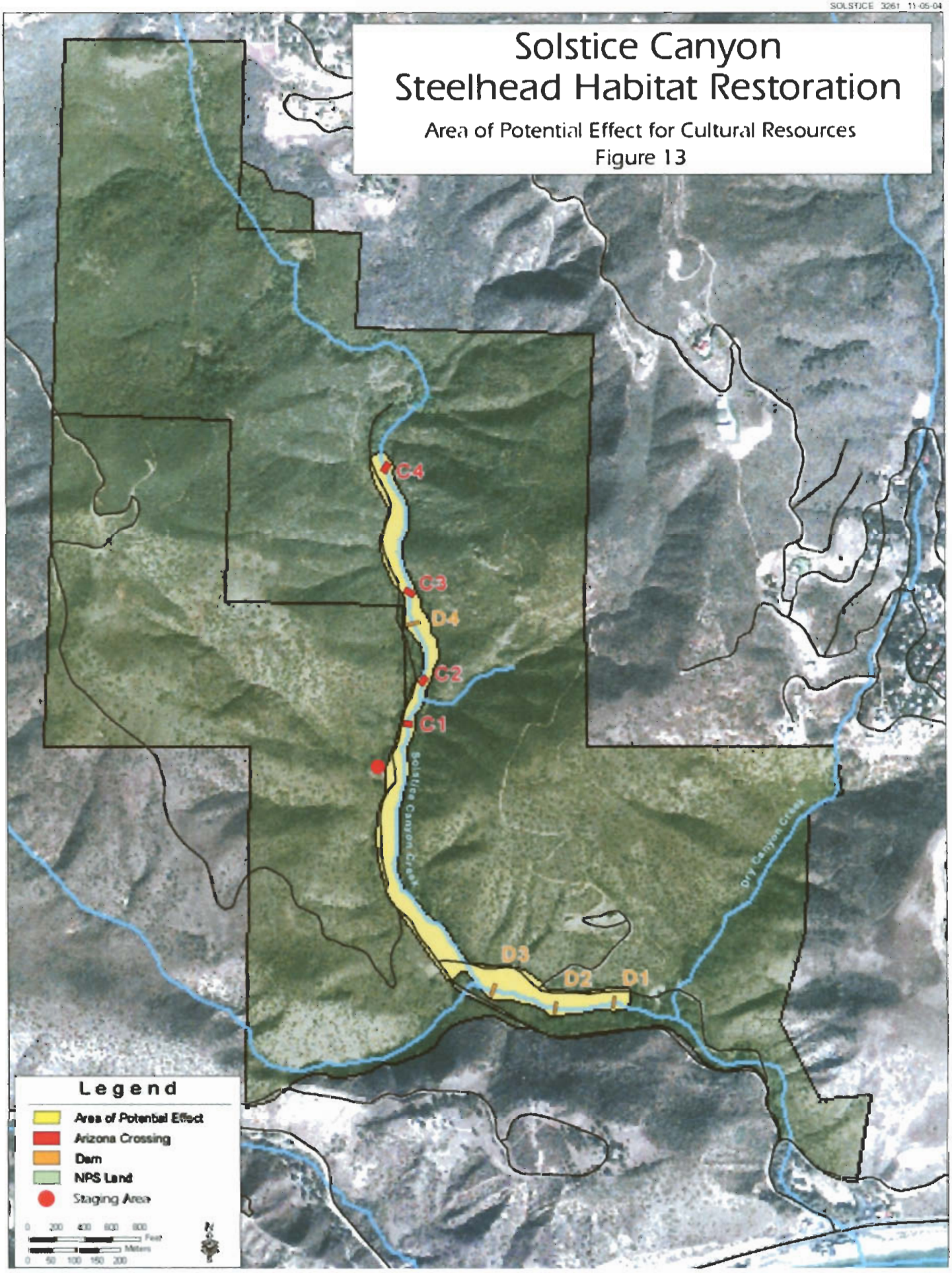
For the purposes of this document, the level of impacts to cultural resources was determined using the following criteria:

- *Negligible impacts*: No potentially eligible or listed properties are present; no direct or indirect impacts.
- *Minor impacts*: Potentially eligible or listed properties are present; no direct impacts or impacts with only temporary effects are expected.
- *Moderate impacts*: Potentially eligible or listed properties are present; indirect impacts or, in the case of structures, where activity is limited to rehabilitation conducted in a manner that preserves the historical and architectural value of the property.

Solstice Canyon Steelhead Habitat Restoration

Area of Potential Effect for Cultural Resources

Figure 13



- *Major impacts*: Potentially eligible or listed properties present; direct impacts, including physical destruction, damage, or alteration of all or part of a property. Isolation of a property from or alteration of the character of a property's setting when that character contributes to its eligibility, including removal from its historic location. Introduction of visual, audible, or atmospheric elements that are out of character with the property of or alter its setting. Neglect of a property resulting in its deterioration or destruction (36 CFR 800.5).

- *Impairment*: Loss, destruction, or degradation of a cultural property, resource, or value to the point that it negatively affects the park's purpose and visitor experience.

In the absence of quantitative data concerning the full extent of actions under a proposed alternative, best professional judgment prevailed.

5.2 NO ACTION ALTERNATIVE

5.2.1 Impacts on Natural Resources

5.2.1.1 Impacts on Biological Resources

Under the No Action alternative the temporary, minor habitat disturbance that would occur during removal of the structures would be avoided. In addition, the temporary filling of pools by sediment stored behind Check Dams 1 and 3 also would be avoided.

Under the No Action alternative the long-term biological benefits of the proposed project would not occur. Steelhead would continue to be prevented from accessing suitable spawning habitat in Solstice Creek upstream of the check dams and Arizona crossings. The movement of fishes and amphibians along Solstice Creek would continue to be restricted by the dams and Arizona crossings.

Cumulative Impacts – Under the No Action alternative, Solstice Creek would remain unavailable to steelhead and would not contribute to the cumulative benefits of efforts to restore the southern steelhead population.

Conclusion – The No Action alternative would have an adverse biological impact because it would result in the continued exclusion of southern steelhead from suitable spawning habitat in Solstice Creek.

5.2.1.2 Impacts on Water Quality/Hydrology

Under the No Action alternative the negligible temporary impacts of sediment disturbance during removal of Arizona Crossing 4 and downstream movement of sediments stored behind the check dams would not occur. However, the failure to remove the check dams has the potential to cause potentially significant impacts to hydrology in the future. During a large storm, the check dams potentially could deflect the stream in such a way that the road is damaged. In addition, the presence of the check dams may be causing a minor adverse impact to water quality because the pools attract people who may swim in them, disturb sediments and erode banks to access the pools, and possibly may spill or release trash or polluting substances into the stream.

Cumulative Impacts – Contribution of the No Action alternative to cumulative degradation of water quality or hydrology in the Santa Monica Mountains area would be insignificant.

Conclusion – The No Action alternative would avoid the extremely minor impacts to water quality that might occur during the removal process. However, the No Action Alternative creates a risk that the dams could alter the course of the stream during storms. In addition, the No Action Alternative probably would result in a minor degradation of water quality from people attracted to the stream by the pools in front of the dams.

5.2.1.3 Impacts on Soils

Under the No Action alternative, the pools below the dams act as an attractant to visitors. Visitors accessing the pools cause a minor amount of erosion.

Cumulative Impacts – The creekbed in Solstice Creek is subject to erosion primarily during storms. Under the No Action alternative, persons accessing the ponds below the dams would contribute to cumulative erosion of the stream channel.

Conclusion – The No Action alternative would contribute a minor amount of erosion to the Solstice Creek stream channel.

5.2.2 Impacts on Cultural Resources

Identified historic properties would not be impacted under the no-action alternative. There would be no project-related ground disturbance with the potential to impact archaeological resources. Historic structures would not be altered, nor would new construction occur that could impact the integrity of Solstice Canyon's historic setting.

Cumulative Effects – The no-action alternative would not contribute to cumulative impacts on identified archaeological resources. Some archaeological resources throughout Solstice Canyon and the Santa Monica Mountains have been adversely impacted from past construction disturbance, visitor use pressures, vandalism, and/or natural environmental factors. Combined with increasing visitor use in the park, other foreseeable construction projects also have the potential to disturb archaeological resources as a result of ground disturbance. If adverse impacts could not be avoided, the NPS would implement data recovery excavations or other mitigation measures.

The no-action alternative also would not contribute to cumulative adverse impacts on historic buildings such as the Keller House. Although the aging building may be expected to structurally deteriorate over time, continued occupancy would help ensure that the building is properly maintained. Any required preservation, maintenance, and/or more comprehensive rehabilitation would be carried out in conformance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (1995).

Conclusion – The no-action alternative would not affect or impair identified cultural resources and would not contribute to past, present or reasonably foreseeable cumulative effects on cultural resources in the area.

Section 106 Summary – In accordance with the Advisory Council on Historic Preservation's regulations (36 CFR 800) implementing Section 106 of the National Historic Preservation Act, the no-action alternative would have no effect on historic properties.

5.2.3 Impacts on Visitor Experience

5.2.3.1 Impacts on Recreation

Under the No Action alternative, minor temporary impacts to recreation during the process of removing the barriers would not occur. However, the structures would continue to pose a safety hazard to recreational park users. The hazardous drop offs at the Arizona crossings would remain. The pools below the dams would continue to attract children who could be hurt by jumping or falling off the dams. In addition, the dams have the potential to deflect the creek and damage the road during a large storm. Damage to the road would hamper vehicle access and patrol and maintenance of the park by park personnel.

Cumulative Impacts – Although the park is generally safe, there are certain risks associated with waterbodies and stream banks. Under the No Action alternative, the dams and Arizona crossings would continue to contribute to risks to visitors to the park.

Conclusion – The No Action alternative would avoid the temporary inconvenience to park users during removal of the structures. However, under the No Action alternative, dams and Arizona crossings would continue to pose a hazard to park visitors.

5.2.3.2 Impacts to Visual Resources

Under the No Action alternative, the man-made structures would remain and would continue to represent a minor compromise to the natural vistas in the creekbed.

Cumulative Impacts – Under the No Action alternative the continued presence of the check dams and Arizona crossings would, in combination with the roads, parking lots and other structures, continue to contribute to the cumulative impacts of man-made structures in an otherwise natural setting.

Conclusions – The continued presence of the Arizona crossings and check dams under the No Action alternative would degrade slightly the natural setting of Solstice Creek.

5.2.4 Impacts on Air Quality

Under the No Action alternative, temporary impacts to air quality during removal of the dams and Arizona crossings would not occur. Leaving the barriers in place would not generate any emissions.

Cumulative Impacts – Because no emissions are associated with the No Action alternative, this alternative would not contribute to cumulative air quality impacts.

Conclusion – The No Action alternative would have no effect on air quality.

5.2.5 Impacts on Noise

The No Action alternative would not affect noise levels in the park since there would be no construction activities. Under the No Action alternative, the temporary noise elevations that would occur during removal of the barriers would not occur.

Cumulative Impacts – Because no noises are associated with the No Action alternative, this alternative would not contribute to cumulative noise impacts.

Conclusion – The No Action alternative would not affect noise levels or impair auditory resources in the project area.

5.2.6 Impacts on Transportation/Traffic

The No Action alternative would have no effect on transportation or traffic since no construction would occur. Under the No Action alternative the temporary small increase in traffic related to construction and worker vehicles would be avoided.

Cumulative Impacts – Because no traffic is associated with the No Action alternative, this alternative would not contribute to cumulative traffic or transportation impacts.

Conclusion – The No Action alternative would not affect traffic or transportation in the project area.

5.3 ALTERNATIVE 1: COMPLETE REMOVAL OF CHECK DAMS AND ARIZONA CROSSINGS

5.3.1 Impacts on Natural Resources

5.3.1.1 Impacts on Biological Resources

Complete removal of check dams and Arizona crossings would temporarily disturb biological resources in the immediate vicinity of the structures. No habitat would be disturbed to access the streambed during removal of Dam 1 or Arizona Crossing 3 because the removals would be accomplished by equipment working from the road. However, a large alder directly behind Dam 1 would be lost by dam removal. Removal of the side wall of Dam 1 also will result in the loss of some riparian vegetation.

Native habitat would not be disturbed during removal of the Keller House Crossing because this crossing is on the main road. A small amount of riparian vegetation (less than 0.1 acre) may be disturbed temporarily to access the streambed for removal of Dams 2 and 3 and Arizona crossings 2 and 4. To access Check Dam 3, two mature sycamore trees may need to be removed from the north bank and an alder may need to be removed on the south bank. A biologist will select access routes that minimize disturbance to native vegetation. Disturbed areas will be revegetated if necessary.

Although no sensitive species are known to occur in the project area, there is a slight potential that disturbance of a portion of the stream bank to access the stream for removal of Dams 2 and 3 and Arizona crossings 2 and 4 could disturb a sensitive plant species or a San Diego desert woodrat nest. However, a biologist will survey the area and identify an access route that avoids sensitive species and minimizes disturbance of riparian vegetation. Therefore, adverse impacts to sensitive species would not occur. A small amount of breeding habitat for California newts and tree frogs would be disturbed during the process of removing the dams and road crossings.

If none of the sediment behind the dams were removed, the large amount of sediment behind Dams 1 and 3 would be permitted to move downstream. Downstream movement of sediments stored behind the check dams would temporarily disturb downstream habitat, but this sediment would gradually be moved downstream by natural processes. This sediment may temporarily fill the pools in front of the dam that provide good habitat for newts. Natural processes will move the sediment downstream and the pools will re-establish. A considerable amount of spawning sized gravel is contained in the sediment behind the dams. The introduction of these gravels into the streambed would be beneficial for steelhead spawning. Removal of some of the sediments behind the dam would reduce the temporary impacts of the release of sediments on downstream habitat. However, removal of sediments would also remove spawning gravel that would benefit spawning activities of southern steelhead.

The only permanent modification of habitat that would occur is the removal of Arizona crossings and check dams that prevent the upstream movement of native fishes. When this project is completed and the downstream barriers at Pacific Coast Highway and Corral Canyon are removed, the federal threatened southern steelhead will have access to Solstice Creek from the ocean to the waterfall by Tropical Terrace. Therefore, the proposed project would, in combination with removal of the downstream barriers, have a substantial beneficial effect on the southern steelhead.

No permanent adverse impacts to sensitive habitats would occur. As discussed above, a small amount of riparian habitat would be disturbed on the stream bank to access the stream for removal of check dams 2 and 3 and Arizona crossings 2 and 4. In addition, an alder and some riparian habitat would be lost when Dam 1 is removed. For each access area, a biologist will select the route that disturbs the least amount of vegetation and that avoids disturbance to trees to the extent possible. If significant disturbance occurs, the area will be revegetated.

Upon completion of the project, movement of fishes and amphibians along the streambed will be facilitated because barriers to movement will have been removed. When the two lowest barriers are removed in the future, southern steelhead will have access to suitable breeding habitat. The long-term impact of the proposed project is a substantial benefit to fish and amphibian movement.

Cumulative Impacts – The proposed project, in combination with the removal of downstream barriers to steelhead passage, would facilitate the re-establishment of steelhead populations in Solstice Creek. In combination with the removal of impediments to steelhead movements on other streams, the proposed project would contribute to the cumulative benefit of restoring the southern steelhead population.

Conclusion – The proposed project is not likely to adversely affect biological resources. The process of removing the structures would temporarily disturb a small amount of stream habitat. This habitat will reestablish probably within a year. The proposed project would have a long-term benefit for steelhead, other fishes and amphibians by restoring passage along the creek.

5.3.1.2 Impacts on Water Quality/Hydrology

During the removal of the check dams and Arizona crossings, water would be piped around the construction site. Therefore, dam and crossing demolition would occur in the dry, and disturbance of sediments during the removal process would not elevate turbidity downstream, nor would dam and road crossing removal have any potential to introduce contaminants to the creek. Dewatering would not occur during the removal of Arizona Crossing 4 because the amount of work required to remove this crossing is minor, and minimal disturbance to the streambed would occur. There may be some disturbance of sediments causing a slight temporary elevation in turbidity during removal of Arizona Crossing 4. However, removal of this road crossing involves minimal work and any resuspension of sediments would be minor and temporary. During all work associated with this project, standard construction Best Management Practices (BMPs) (such as handling of fuels and other hazardous substances in locations where there is no potential for runoff into the streambed) would be implemented.

After the check dams are removed (especially Dams 1 and 3), sediments stored behind these dams will move downstream. The resuspension of the fines in these sediments will elevate turbidity in the creek. However, the movement of fines would occur during stormy periods of high flow when turbidity is elevated naturally. When flows subside, fine sediments would settle, and turbidity in the creek would return to normal. Removal of the check dams would not result in turbidity levels substantially higher than natural conditions. The objectives in the Water Quality Control Plan for the Los Angeles Region (RWQCB 1994) is that changes in turbidity should not cause a nuisance or adversely affect beneficial uses and should not result in an exceedance over natural turbidity levels of 20 percent. Removal of the check dams would not result in a violation of these objectives. Partial removal of sediments behind check dams potentially could result in lower turbidity levels during very high flows than no sediment removal because there would be a smaller volume of sediment to be suspended. However, turbidity related to sediments behind the check dams would be masked by the natural turbidity that occurs during high-flow storm events.

When the dams are removed, sediments stored behind the dams would gradually move downstream. Sediments may temporarily fill downstream pools but pools would reestablish as high-flow events continue to transport sediments downstream. The temporary impacts of the sediment stored behind the dams on downstream reaches of Solstice Creek might be reduced by the alternative to only remove part of the sediment. However, Roche and Kearns (2002) analyzed the particle size distribution of sediments stored behind the check dams and the Keller House crossing and determined that removal of the dams and crossing without any removal of stored sediments would be unlikely to cause sediment transport significantly above natural sediment fluxes.

Cumulative Impacts – The proposed project would not result in degradation of water quality and therefore would not contribute to cumulative impacts on water quality.

Conclusion – The proposed project is unlikely to adversely affect water quality or hydrology. Removal of all of the structures except Arizona Crossing 4 would be done in the dry so the streambed would not be disturbed. Removal of Arizona Crossing 4 would result in a small but insignificant disturbance to stream sediments. Downstream movement of sediment stored behind the check dams would be unlikely to cause sediment transport significantly above natural sediment fluxes.

5.3.1.3 Impacts on Soils

Removal of the check dams and Arizona crossings would result in a recontouring of the landscape. There may be a small potential for topsoil erosion in the area where structures are removed. However, such a small area would be disturbed that impacts would be less than significant.

Cumulative Impacts – Because complete removal of check dams and Arizona crossings would result in, at most, minor temporary erosion, the project would not contribute to cumulative impacts to soils.

Conclusion – Complete removal of check dams and Arizona crossings would result in at most a minor amount of temporary erosion. The project would not cause the area to become unstable. There is no potential for land sliding, lateral spreading, subsidence, liquefaction or collapse. The soils structure of the project areas will not change. Complete removal of check dams and Arizona crossings would have a less than significant impact on soils and geology.

5.3.2 Impacts on Cultural Resources

The dams in Solstice Creek no longer function as designed and do not have significance by themselves. The dams are not contributing elements to a cultural landscape. The cultural landscape of the Roberts Ranch is not significantly associated with the accomplishments of Fred Roberts. It lost integrity when the house, barns, fences, and other structures were destroyed during the fire in 1982 and the flood in 1983, and subsequent neglect. Therefore removing the dams will not impair a cultural resource.

The Arizona crossings from the road alignment to be removed will have a minor but not adverse effect on the Solstice Road, which is presumed to be eligible. Removal of the crossings will actually restore the historic condition of the road. Removal of the non-historic crossings will have a negligible impact on the road alignment. Only the road near the project footprint is included in the Area of Potential Effect.

There are negligible impacts to known ethnographic resources.

There are archaeological sites within the project area but project activities will have negligible effects on known archaeological sites. There is a possibility that archaeological resources are concealed by the dam shoulders and may be revealed during removal. The NPS has an existing Memorandum of Agreement for inadvertent discoveries in Solstice Canyon. Therefore the known archaeological sites were not automatically included in the Area of Potential Effect.

Many historic structures in Solstice Canyon have become historic archaeological sites. This project will have negligible impacts on these historic archaeological sites, and none of them are included in the Area of Potential Effect.

The historic Keller House is assumed to be eligible to the National Register of Historic Places. Removal of the non-historic Arizona crossing and replacing it with a bridge will have negligible effects on the Keller House or its setting. Therefore the Keller House is outside the Area of Potential Effect.

The alternative of complete removal would have no effects on known cultural and historic resources in the Area of Potential Effect or in Solstice Canyon. Identified potential historic properties would be unimpaired. Although project-related ground disturbance has the potential to impact undiscovered archaeological resources, ground disturbance will be monitored by a professional archaeologist with authority to stop construction until the resources can be evaluated. The park has an existing Memorandum of Agreement if inadvertent discoveries occur. Historic structures would not be altered.

Cumulative Effects – The alternative of complete removal would not contribute to cumulative impacts on identified historic resources. Some archaeological resources throughout Solstice Canyon and the Santa Monica Mountains have been adversely impacted from past construction disturbance, visitor use pressures, vandalism, and/or natural environmental factors. However, this project will not increase these

pressures. The preferred alternative of complete removal would not contribute to cumulative adverse impacts on historic buildings such as the Keller House, or other historic resources. Any required preservation, maintenance, and/or more comprehensive rehabilitation would be carried out in conformance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (1995).

Conclusion – The alternative of complete removal would not affect or impair identified cultural resources and would not contribute to past, present or reasonably foreseeable cumulative effects on cultural resources in the area.

Section 106 Summary – In accordance with the Advisory Council on Historic Preservation's regulations (36 CFR 800) implementing Section 106 of the National Historic Preservation Act, the complete removal alternative would have no effect on historic properties and they would be unimpaired.

5.3.3 Impacts on Visitor Experience

5.3.3.1 Impacts on Recreation

During construction, the park may be partially closed, resulting in minor temporary restrictions to recreational use. Even though the park may be partially closed during construction, any closure would be limited to vehicles only. Because the park is not fenced, the public tends to ignore signage and enter and use the park. The park's past experience with construction projects has found children climbing on construction equipment and patrons walking through construction areas during non-construction hours, even though signs warning of the dangers were posted. This activities have the potential to result in public safety impacts. These potentially significant impacts can be mitigated to less than significant by fencing and signs.

At some point during construction, trails will likely be closed for about two weeks or even up to a month. During removal of Arizona Crossings 2 and/or 3, only a portion of access may have to be closed. The trail splits at Arizona Crossing 2 and two trails are available from Arizona Crossings 2 to 3. The north trail (formal trail) will remain open and the informal south trail will be closed. Access could be maintained but would have to be managed with signs to direct hikers to the upper trail during the construction period. With the placement of signs as mitigation to direct hikers away from construction areas and inform them of alternate trails, temporary construction impacts would be less than significant.

Permanent removal of the Arizona crossings would result in the elimination of hazardous drop-offs adjacent to wet stream crossings. With two trails at Arizona Crossing 2, if the informal south trail were removed, there would be no impact as long as the formal main trail would remain. With the removal of Arizona Crossing 3, a slick wet cement crossing with a drop-off would become a wet cobble crossing at stream grade. This wet cobble crossing may represent an inconvenience. The impacts of removal of Arizona Crossing 3 would be less than significant after mitigation. The removal of Arizona crossings should improve safety at trail stream crossings. Arizona Crossing 4 is not used by the public.

Mitigation: During construction, the construction staging area should be separated from the public by temporary fencing and warning signs. To the extent feasible, each separate construction area should be, at a minimum, cordoned off by tape or some type of temporary barrier if fencing is not feasible. Signs shall be placed warning of possible dangers at all construction locations. Signs shall explicitly warn of dangers in both English and Spanish. Consideration of placement of cameras in select locations may be warranted as the park has a past history of vandalism at construction sites.

Mitigation for the trail closures during construction shall include explicit signage in English and Spanish. If necessary, construction personnel may be required to be present at specific locations to assure that trail users do not cross into unauthorized areas that may pose a danger.

Mitigation for the loss of the Arizona Crossing 3 shall include signage that shows optional paths for other creek crossings.

Cumulative Impacts – Because safety concerns and trail closures during construction are temporary and can be mitigated to less than significant, they would not contribute to cumulative impacts to recreation. In the long term, full removal of the check dams and Arizona crossings would remove safety risks to recreational users and would no longer contribute to cumulative risks to park goers.

Conclusions – During removal of the barriers, there may be some temporary trail closures and some temporary risks to the public from construction equipment. These impacts could be mitigated to less than significant with fencing and signs. In the long term, removal of check dams and Arizona crossings would eliminate potential safety hazards. Loss of Arizona Crossing 3 could be mitigated to less than significant by signs directing hikers to an optional alternate trail.

5.3.3.2 Impacts to Visual Resources

The individual projects are small and would generally have little impact on the overall character of the visitor's visual experience. Removal of small dams will result in a more open, natural setting. However, the hydrologic waterfall features of Dam 1 and Dam 2 will be lost. For Dam 3, the concrete dam structure will be removed, resulting in a more natural environment. Similarly, the concrete to be removed at the Arizona crossings will also result in a more natural environment. Overall, impacts are considered to be less than significant.

Cumulative Impacts – Removal of man-made structures would contribute in a small way to cumulative efforts to preserve and increase the natural setting of the Santa Monica Mountains.

Conclusion – Removal of man-made barriers would increase the natural setting of the park, although aesthetically pleasing waterfalls at the check dams would be lost.

5.3.4 Impacts on Air Quality

5.3.4.1 Standards of Significance

Regional Emission Standards

The following significance thresholds for construction emissions have been established by the SCAQMD. Projects in the South Coast Air Basin with construction-related emissions that exceed any of these emission thresholds should be considered to be significant:

- 75 pounds per day of ROG
- 100 pounds per day of NOx
- 550 pounds per day of CO
- 150 pounds per day of PM_{10}
- 150 pounds per day of Sox

The daily operational emissions "significance" thresholds are:

- 55 pounds per day of ROG
- 55 pounds per day of NOx
- 550 pounds per day of CO
- 150 pounds per day of PM_{10}
- 150 pounds per day of Sox

Projects in the South Coast Air Basin with operation-related emissions that exceed any of the emission thresholds should be considered to be significant;

Local Emission Standards

- California State 1-hour CO standard of 20.0 ppm
- California State 8-hour CO standard of 9.0 ppm

The significance of localized project impacts depends on whether ambient CO levels in the vicinity of the project are above or below State and federal CO standards. If ambient levels are below the standards, a project is considered to have significant impacts if project emissions result in an exceedance of one or more of these standards. If ambient levels already exceed a state or federal standard, then project emissions are considered significant if they increase ambient concentrations by a measurable amount. The SCAQMD defines a measurable amount as 1.0 ppm or more for the 1-hour CO concentrations or 0.45 ppm or more for the 8-hour CO concentrations.

Air pollutant emissions associated with the project could occur over the short-term during site demolition activities. The project would not result in additional vehicle trips, and no long-term emissions, or impacts, would occur.

Short-Term Air Quality Impacts

Demolition activities would result in the generation of air pollutants. These emissions would primarily be (1) exhaust emissions from powered construction equipment, (2) dust generated from demolition, earthmoving, excavation, and other construction activities, and (3) motor vehicle emissions associated with vehicle trips. No asphalt, paints, or coatings would be applied.

The project includes the demolition of seven minor dams and crossings. A bridge could also be put in at the Keller House crossing. The bridge is to be either prefabricated or a flat railcar bridge, and any construction associated with its installation would not exceed that generated by the heavy equipment used in the demolition effort.

An effort would be made to keep the park closed or partially closed to vehicular traffic on weekdays for no more than 30 days during demolition activities. This analysis assumes that the three check dams would be removed simultaneously over a two-week period. This would be followed by the simultaneous removal of the four crossings, also estimated at two weeks in total. The analysis assumes that this demolition occurs in the fall of 2004.

Earthmoving and demolition activities will consume diesel fuel and thus produce combustion by-products. These construction emissions were estimated using the SCAQMD's URBEMIS2002 model (Version 7.4.2) and are included in Table 3. Equipment use and vehicle trips are based on model default values for the South Coast Air Basin.

The analysis assumes that each of the dams/crossings occupies an area of 2,500 square feet. To determine the volume of materials to be removed during demolition, a depth/thickness of one foot is assumed. Based on this scenario, each dam/crossing would result in the demolition of 2,500 cubic feet or 93 cubic yards of material. This volume of material is assumed to be removed from each of the seven demolition sites, and truck-use and dust are modeled based on this volume. Demolition would be accomplished using typical construction equipment as described below.

Dam 1 – This dam would be demolished using a crane and wrecking ball. A bucket would be used to lift debris out to the road to a truck for transport. This material could then trucked to a proximate stockpile or removed to an offsite disposal facility. This analysis assumes offsite removal and the URBEMIS estimates this distance at 30 miles round trip for all noted demolition. The creek would be dewatered using electric pumps. A generator is also assumed to power these pumps.

Table 3
Projected Demolition Emissions (Lb/Day)

Source	CO	NOx	ROG	SOx	PM_{10}[1]
Demolition of Three Dams[2]					
Equipment & Worker Vehicles	78.4	72.1	9.8	0.0	3.7
SDAPCD Daily Threshold	550	100	75	150	150
Exceeds Threshold?	No	No	No	No	No
Demolition of Four Crossings					
Equipment, Worker Vehicles & Coatings	103.0	110.3	13.8	0.0	5.6
SDAPCD Daily Threshold	550	100	75	150	150
Exceeds Threshold?	No	Yes	No	No	No

[1] Includes PM_{10} for both exhaust and dust.
[2] Includes eight pieces of heavy equipment each operating 8 hours per day.
[3] Includes 11 pieces of heavy equipment each operating 8 hours per day.
Source: California Air Resources Board, URBEMIS2002: Version 7.4.2

Dam 2 – Demolition would occur using a hoe-ram, or rubber-tired backhoe fitted with a hydraulic ramming device. A loader would be used to carry debris out of the channel to trucks for transport to the stockpile or to an offsite disposal point, as assumed in this analysis. A small bulldozer would be used for minor re-grading of the upstream channel. Channel dewatering would use the equipment noted for Dam 1.

Dam 3 – This dam would also be demolished using a hoe-ram and a crane with wrecking ball. The wrecking ball would be replaced with a bucket to load the trucks. A loader would grade the channel banks. Channel dewatering would use the equipment noted for Dam 1.

Arizona Crossing 1 – Demolition would occur using a hoe-ram as described above. A wheel loader would be used to carry debris out to a truck for transport to the stockpile or offsite disposal point, as assumed in this analysis. The channel would be dewatered using electric pumps, and a generator is assumed to power these pumps.

Arizona Crossing 2 – Demolition would occur using a hoe-ram as described above. A second backhoe would be used to lift the debris out of the creek and place it on the trucks for subsequent disposal offsite. Dewatering would occur using the electric pumps and generator noted for Arizona Crossing 1.

Arizona Crossing 3 – Demolition would occur using a hoe-ram as described above. A wheel loader would be used to carry debris out to a truck for transport. The channel would be dewatered using electric pumps. A second generator is assumed to power these pumps.

Arizona Crossing 4 – Demolition would occur using jack hammers to break up the concrete. A compressor is assumed to power the jack hammers. A backhoe would be used to remove debris from the creek and deposit this material into a wheel loader that would carry the debris out to a truck for subsequent transport. This work would be accomplished "wet," and no dewatering is anticipated.

The results of the analysis are included in Table 3. Note that simultaneous demolition of the three dams would not exceed the daily threshold values set forth by the SCAQMD for construction. However, simultaneous demolition of the four Arizona crossings could exceed the daily threshold for NOx, and the impact is considered as potentially significant.

Mitigation – The provided analysis indicates that NOx emissions are projected to exceed the SCAQMD's threshold criterion and mitigation is warranted to reduce these emissions to less than significant. Therefore, the following measures shall be implemented.

- All heavy equipment shall be maintained in a proper state of tune as per the manufacturer's specifications.
- Heavy equipment shall not be allowed to remain idling for more than five minutes' duration.
- Trucks shall not be allowed to remain idling for more than two minutes' duration.
- Electric power supplied from the power grid shall be used to the exclusion of gasoline or diesel generators and compressors whenever feasible.
- Heavy equipment aggregate use shall not exceed 80 hours per day.
- The construction contractor shall log equipment use and a copy of the logs shall be retained at the project site for county inspection.

Level of Significance After Mitigation – As noted in Table 3 each piece of heavy equipment generates about 1.25 pounds of NOx per hour. A restriction to 80 hours of use would then generate approximately 100 pounds per day. The other noted measures could further reduce emissions by one to two percent and the resultant levels would remain under the 100 pound-per-day threshold value, reducing the impact to less than significant. Alternatively, if the generators and/or compressor are powered by electricity supplied from the grid, this would reduce NOx to less than a level of significance, alleviating the need for the other measures.

Cumulative Impacts – Cumulative projects include local development as well as general growth within the project area. However, as with most development, the greatest source of emissions is from mobile sources, which travel well outside the local area. Therefore, from an air quality standpoint, the cumulative analysis would extend beyond any local projects and, when wind patterns are considered, would cover an even larger area. Accordingly, the cumulative analysis for the project's air quality must be generic by nature.

The project area is out of attainment for ozone and PM_{10}. Construction and operation of cumulative projects will further degrade the local air quality, as well as the air quality of the South Coast Air Basin (SCAB). The greatest cumulative impact on the quality of the regional air cell will be the incremental addition of pollutants mainly from increased traffic from residential, commercial, and industrial development and the use of heavy equipment and trucks associated with the construction of these projects.

In accordance with the SCAQMD methodology, any project that is less than significant or can be mitigated to less than significant does not add significantly to the cumulative impact. Implementation of the noted mitigation measures would ensure that project construction does not exceed the daily threshold limitations, reducing the impact to less than significant. This then also reduces the project's contribution to the cumulative impact to less than significant.

Conclusion – The proposed project would have a potentially significant short-term air quality impact by exceeding the threshold for NO_X emissions. This short-term air quality impact can be mitigated to less than significant.

5.3.5 Impacts on Noise

Noise impacts can be broken down into three categories. The first is "audible" impacts, which refers to increases in noise level that are perceptible to humans. Audible increases in noise levels generally refer to a change of 3 dBA or more, since this level has been found to be barely perceptible in exterior environments. The second category, "potentially audible," refers to a change in noise level between 1 and 3 dBA. This range of noise levels was found to be noticeable to sensitive people in laboratory environments. The last category includes changes in noise level of less than 1 dBA that are typically "inaudible" to the human ear except under quiet conditions in controlled environments. Only "audible" changes in noise levels at sensitive receptor locations are considered potentially significant.

For stationary sources, the applicable noise standards include criteria established by local as well as any State regulations applicable to the proposed project. Mobile-source noise (i.e., vehicle noise) is preempted from local regulation. Here an impact is considered significant if the project were to increase this noise level by 3 dBA CNEL (barely noticeable in an exterior environment).

Noise levels associated with demolition activities would be higher than the ambient noise levels in the project area today, but would subside once demolition is completed. Two types of noise impacts could occur during demolition activities. First, the transport of workers and equipment to the construction site and removal of debris would incrementally increase noise levels along site access roadways. Even though there could be a relatively high single event noise exposure potential with passing trucks (a maximum noise level of 86 dBA at 50 feet), the increase in noise would be less than 1 dBA when averaged over a 24-hour period, and would therefore have a less than significant impact on noise receptors along the truck routes.

The second type of impact is related to noise generated by onsite heavy equipment operations. Table 4 lists the typical construction equipment noise levels recommended for noise impact assessment at a distance of 50 feet.

Table 4
Demolition and Construction Equipment Source Noise Levels

Equipment Type	Typical Equipment at 50 ft. (in dBA)	Quieted Equipment at 50 ft. (in dBA)[a]
Air Compressor	81	71
Backhoe	85	80
Concrete Pump	82	80
Concrete Vibrator	76	70
Concrete Breaker	82	75
Truck Crane	88	80
Dozer	87	83
Generator	78	71
Loader	84	80
Paver	88	80
Pneumatic Tools	85	75
Water Pump	76	71
Power Hand Saw	78	70
Shovel	82	80
Trucks	88	83

Source: **Bolt, Beranek, and Newman, *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances, U.S. Environmental Protection Agency*, 1971.**

Notes: **[a] Quieted equipment can be designed with enclosures, mufflers, or other noise-reducing features.**

Noise ranges have been found to be similar during all phases of construction, although the actual construction of structures typically results in less noise than site preparation activities. The grading and site preparation phase tends to create the highest noise levels because the noisiest construction equipment is found in the earthmoving equipment category. This category includes excavating machinery (backfillers, bulldozers, draglines, front loaders, etc.) and earthmoving and compacting equipment (compactors, scrapers, graders, etc.). Typical operating cycles may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Noise levels at 50 feet from earthmoving equipment range from 73 to 96 dBA, while Leq noise levels range up to about 89 dBA.

Composite construction noise is best characterized by Bolt, Beranek and Newman (USEPA December 31, 1971). In their study, construction noise for commercial development is presented as 89 dBA Leq when measured at a distance of 50 feet from the construction effort. This value takes into account both the number of pieces and spacing of the heavy equipment used in the construction effort.

The proposed demolition activities would not require the large assemblages of equipment typically used in large-scale construction. Furthermore, local topography of the terrain, coupled with the dense vegetation, would further reduce noise from this value. However, as a worst-case scenario, the 89-dBA value is used to assess the impact of the construction effort.

The project is located within a national recreation area, and onsite construction noise is not subject to local regulation by either the City of Malibu or County of Los Angeles. Additionally, there are no sensitive land uses located within the project area. Still, because noise is not stopped by municipal boundaries, the local city and county standards are used as the basis for impact.

The City of Malibu does not set noise limitations for construction activities. The city does, however, set days and hours during which construction may occur. The city allows unimpeded construction between the hours of 7:00 a.m. and 7:00 p.m., Monday through Friday, and 8:00 a.m. and 5:00 p.m. on Saturdays. No construction is allowed on Sundays or holidays. Similarly, the County of Los Angeles limits construction that may create a disturbance across any residential or commercial property line to between the hours of 7:00 a.m. and 7:00 p.m. Monday through Saturday. No construction is permitted on Sundays or holidays.

The NPS proposes that construction be performed Monday through Friday between the hours of 7:00 a.m. and 5:00 p.m. No work is to occur on weekends. These hours are within those allowed for construction by both the City of Malibu and County of Los Angeles and any impacts would be less than significant.

Additionally, based on a composite noise level of 89 dBA Leq as measured at a distance of 50 feet, the 75 dBA noise level associated with construction proximate to sensitive Los Angeles County receptors would occur at a distance of 250 feet from the equipment. No sensitive County of Los Angeles land uses are located within this distance from any of the demolition sites and, again, any impact is less than significant.

Finally, while impacts on sensitive species are not regulated by the City of Malibu or County of Los Angeles, the NPS is concerned about impacts to the birds that inhabit the area. Construction is to be performed during the months of September and October, out of the nesting and breeding season.

Cumulative Impacts – During the period that demolition of the in-stream barriers was occurring, the noise of construction equipment would contribute to cumulative noises (such as vehicle traffic in the project area). Demolition activities would be short-term and would not impact any sensitive receptors. Therefore, the proposed project's contribution to noise impacts would be less than significant.

Conclusion – Demolition of structures would raise noise levels in the project area during the time that it would take to remove the barriers. However, no sensitive receptors would be affected by this short-term increase in noise, and impacts would be less than significant.

5.3.6 Impacts on Transportation/Traffic

The project would result in a temporary increase in construction-related traffic and construction workers. Because the individual project actions are small, the construction equipment is expected to be limited to no more than two to three pieces of equipment working in one area. Since there will be no permanent increase in traffic, the impacts are considered less than significant.

Cumulative Impacts – Because there will not be a permanent increase in traffic, there will be no cumulative addition to the roadways in the area, and no impacts to established congestion management plans.

Conclusions – The complete removal of check dams and Arizona crossings would result in a minor temporary increase in traffic within the park. Impacts would be short term and less than significant.

5.4 ALTERNATIVE 2: PARTIAL REMOVAL OF THE CHECK DAMS AND COMPLETE ARIZONA CROSSINGS

5.4.1 Impacts on Natural Resources

5.4.1.1 Impacts on Biological Resources

The impacts to biological resources from partial removal of the check dams would be similar to those described for complete removal of the check dams. Partial removal of the check dams and complete removal of the Arizona crossings would temporarily disturb biological resources in the immediate vicinity of the structures. No habitat would be disturbed to access the structures during partial removal of Dam 1 or Arizona Crossing 3 because the removals would be accomplished by equipment working from the road. However, one alder would be lost by the removal of Dam 1. Because a portion of Dam 1 would be left in place there would be less disturbance to riparian vegetation than would occur with complete removal of the dam. Native habitat would not be disturbed during removal of the Keller House Crossing because this crossing is on the main road. A small amount of riparian vegetation (less than 0.1 acre) may be disturbed temporarily to access the streambed for partial removal of Dams 2 and 3 and Arizona Crossings 2 and 4. To access Check Dam 3 two mature sycamore trees may need to be removed from the north bank and an alder may need to be removed on the south bank. A biologist will select access routes that minimize disturbance to native vegetation. Disturbed areas will be revegetated if necessary.

Although no sensitive species are known to occur in the project area, there is a slight potential that disturbance of a portion of the stream bank to access the stream for partial removal of Dams 2 and 3 and removal of Arizona Crossings 2 and 4 could disturb a sensitive plant species or a San Diego desert woodrat nest. However, a biologist will survey the area and identify an access route that avoids sensitive species and minimizes disturbance of riparian vegetation. Therefore, adverse impacts to sensitive species would not occur. A small amount of breeding habitat for California newts and tree frogs would be disturbed during the process of removing the road crossings and most of the dams.

If none of the sediment behind the dams were removed, the large amount of sediment behind Dams 1 and 3 would be permitted to move downstream. Downstream movement of sediments stored behind the check dams would temporarily disturb downstream habitat, but this sediment would gradually be moved downstream by natural processes. This sediment may temporarily fill the pools in front of the dam that provide good habitat for newts. Natural processes will move the sediment downstream and the pools will re-establish. A considerable amount of spawning sized gravel is contained in the sediment behind the dams. The introduction of these gravels into the streambed would be beneficial for steelhead spawning. Removal of some of the sediments behind the dam would reduce the temporary impacts of the release of sediments on downstream habitat. However, removal of sediments would also remove spawning gravel that would benefit spawning activities of southern steelhead.

The only permanent modification of habitat that would occur is the removal of the Arizona crossings and portions of the check dams that prevent the upstream movement of native fishes. When this project is completed and the downstream barriers at Pacific Coast Highway and Corral Canyon are removed, the federal threatened southern steelhead will have access to Solstice Creek from the ocean to the waterfall by Tropical Terrace. Therefore, the proposed project would, in combination with removal of the downstream barriers, have a substantial beneficial effect on the southern steelhead.

No permanent adverse impacts to sensitive habitats would occur. As discussed above, a small amount of riparian habitat including a couple of alder and sycamore trees would be disturbed during structure removal. For each access area, a biologist will select the route that disturbs the least amount of vegetation and that avoids disturbance to trees to the extent possible. If significant disturbance occurs, the area will be revegetated.

Upon completion of the project, movement of fishes and amphibians along the streambed will be facilitated because barriers to movement will have been removed. When the two lowest barriers are removed in the future, southern steelhead will have access to suitable breeding habitat. The long-term impact of the proposed project is a substantial benefit to fish and amphibian movement.

Cumulative Impacts – The proposed project, in combination with the removal of downstream barriers to steelhead passage, would facilitate the re-establishment of steelhead populations in Solstice Creek. In combination with the removal of impediments to steelhead movements on other streams, the proposed project would contribute to the cumulative benefit of restoring the southern steelhead population.

Conclusion – The proposed project is not likely to adversely affect biological resources. The process of removing the barriers would temporarily disturb a small amount of stream habitat. This habitat will reestablish probably within a year. The proposed project would have a long-term benefit for steelhead, other fishes and amphibians by restoring passage along the creek.

5.4.1.2 Impacts on Water Quality/Hydrology

The impacts to hydrology and water quality of the partial removal of the check dams and complete removal of the Arizona crossings would be identical to the impacts described above for complete removal of all the barriers. During the partial removal of the check dams and complete removal of the Arizona crossings, water would be piped around the construction site. Therefore, dam and crossing demolition will occur in the dry, and disturbance of sediments during the removal process would not elevate turbidity downstream, nor would dam and road crossing removal have any potential to introduce contaminants to the creek. Dewatering would not occur during the removal of Arizona Crossing 4 because the amount of work required to remove this crossing is minor and minimal disturbance to the streambed would occur. There may be some disturbance of sediments causing a slight temporary elevation in turbidity during removal of Arizona Crossing 4. However, removal of this road crossing involves minimal work and any resuspension of sediments would be minor and temporary. During all work associated with this project, standard construction Best Management Practices (such as handling of fuels and other hazardous substances in locations where there is no potential for runoff into the streambed) will be implemented.

After partial removal of the check dams (especially Dams 1 and 3), sediments stored behind these dams will move downstream. The resuspension of the fines in these sediments will elevate turbidity in the creek. However, the movement of fines would occur during stormy periods of high flow when turbidity is elevated naturally. When flows subside, fine sediments would settle and turbidity in the creek would return to normal. Partial removal of the check dams would not result in turbidity levels substantially higher than natural conditions. The objectives in the Water Quality Control Plan for the Los Angeles Region (RWQCB 1994) are that changes in turbidity should not cause a nuisance or adversely affect beneficial uses and should not result in an exceedance over natural turbidity levels of 20 percent. Partial removal of the check dams would not result in a violation of these objectives. Partial removal of sediments behind the check dams potentially could result in lower turbidity levels during very high flows than no sediment removal because there would be a smaller volume of sediment to be suspended. However, turbidity related to sediments behind the check dams would be masked by the natural turbidity that occurs during high-flow storm events.

When the in-stream portions of the dams are removed, sediments stored behind the dams would gradually move downstream. Sediments may temporarily fill downstream pools but pools would reestablish as high-flow events continue to transport sediments downstream. The temporary impacts of the sediment stored behind the dams on downstream reaches of Solstice Creek might be reduced by the

alternative to only remove part of the sediment. However, Roche and Kearns (2002) analyzed the particle size distribution of sediments stored behind the check dams and the Keller House crossing and determined that removal of the dams and crossings without any removal of stored sediments would be unlikely to cause sediment transport significantly above natural sediment fluxes.

Cumulative Impacts – The proposed project would not result in degradation of water quality and therefore would not contribute to cumulative impacts on water quality.

Conclusion – The proposed project is unlikely to adversely affect water quality or hydrology. Work on all of the structures except Arizona Crossing 4 would be done in the dry so the streambed would not be disturbed. Removal of Arizona Crossing 4 would result in a small but insignificant disturbance to stream sediments. Downstream movement of sediment stored behind the check dams would be unlikely to cause sediment transport significantly above natural sediment fluxes.

5.4.1.3 Impacts on Soils

The partial removal of the check dams and full removal of the Arizona crossings would have impacts on soils and geology similar to Alternative 1. Temporary disturbance of streambanks to remove structures may have a potential to cause minor erosion of topsoil. These impacts would be temporary until the areas are revegetated and would involve such a small area that impacts would be less than significant.

Cumulative Impacts – Because partial removal of the check dams and complete removal of the Arizona crossings would result in, at most, minor temporary erosion, the project would not contribute to cumulative impacts to soils.

Conclusion – Partial removal of the check dams and complete removal of the Arizona crossings would result in at most a minor amount of temporary erosion. The project would not cause the area to become unstable. There is no potential for land sliding, lateral spreading, subsidence, liquefaction or collapse. The soils structure of the project areas will not change. Partial removal of the check dams and complete removal of the Arizona crossings would have a less than significant impact on soils and geology.

5.4.2 Impacts on Cultural Resources

Identified historic properties would not be impacted under the partial removal alternative. There would be no project-related ground disturbance at the dam shoulders and therefore a negligible potential to encounter buried archaeological resources. Historic structures would not be altered.

The dams in Solstice Creek no longer function as designed and do not have significance by themselves. The dams are not contributing elements to a cultural landscape. The cultural landscape of the Roberts Ranch is not significantly associated with the accomplishments of Fred Roberts. It lost integrity when the house, barns, fences, and other structures were destroyed during the fire in 1982 and the flood in 1983, and subsequent neglect. Therefore partial removal of the dams will not impair a cultural resource.

The Arizona crossings from the road alignment to be removed will have a minor but not adverse effect on the Solstice Road, which is presumed to be eligible. Removal of the crossings will actually restore the historic condition of the road. Removal of the non-historic crossings will have a negligible impact on the road alignment. Only the road near the project footprint is included in the Area of Potential Effect.

There are negligible impacts to known ethnographic resources.

There are archaeological sites within the project area but project activities will have negligible effects on known archaeological sites. Partial removal of the dams will disturb less earth than Alternative 1, full

removal, and therefore, has less of a potential to uncover unknown archaeological resources. The NPS has an existing Memorandum of Agreement for inadvertent discoveries in Solstice Canyon. Therefore the known archaeological sites were not automatically included in the Area of Potential Effect.

Many historic structures in Solstice Canyon have become historic archaeological sites. This project will have negligible impacts on these historic archaeological sites, and none of them are included in the Area of Potential Effect.

The historic Keller House is assumed to be eligible to the National Register of Historic Places. Removal of the non-historic Arizona crossing and replacing it with a bridge will have negligible effects on the Keller House or its setting. Therefore the Keller House is outside the Area of Potential Effect.

The alternative of partial removal of the dams and full removal of the crossings would have no effects on known cultural and historic resources in the Area of Potential Effect or in Solstice Canyon. Identified potential historic properties would be unimpaired. Although project-related ground disturbance has the potential to impact undiscovered archaeological resources, ground disturbance will be monitored by a professional archaeologist with authority to stop construction until the resources can be evaluated. The park has an existing Memorandum of Agreement if inadvertent discoveries occur. Historic structures would not be altered.

Cumulative Effects – The partial removal alternative would not contribute to cumulative impacts on identified historic resources. Some archaeological resources throughout Solstice Canyon and the Santa Monica Mountains have been adversely impacted from past construction disturbance, visitor use pressures, vandalism, and/or natural environmental factors. This project will not increase these pressures.

The partial removal alternative also would not contribute to cumulative adverse impacts on historic buildings such as the Keller House. Although the aging building may be expected to structurally deteriorate over time, continued occupancy would help ensure that the building is properly maintained. Any required preservation, maintenance, and/or more comprehensive rehabilitation would be carried out in conformance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (1995).

Conclusion – The partial removal alternative would not affect or impair identified cultural resources and would not contribute to past, present or reasonably foreseeable cumulative effects on cultural resources in the area.

Section 106 Summary – In accordance with the Advisory Council on Historic Preservation's regulations (36 CFR 800) implementing Section 106 of the National Historic Preservation Act, the partial removal alternative would have no effect on historic properties.

5.4.3 Impacts on Visitor Experience

5.4.3.1 Impacts on Recreation

For Alternative 2, partial removal of the check dams and full removal of the Arizona crossings, the impacts to recreation would be similar to Alternative 1. During construction the park may be partially closed, resulting in minor temporary restrictions to recreational use. Even though the park may be partially closed during construction, that closure is limited to vehicles only. As the park is not fenced, the public tends to ignore signage and enter and use the park. The park's past experience with construction projects has found children climbing on construction equipment and patrons walking through construction areas during non-construction hours, even though signs warning of the dangers were posted. These activities have the potential to result in public safety impacts. These potentially significant impacts can be mitigated to less than significant by fencing and signs.

At some point during construction, trails will likely be closed for about two weeks or even up to a month. During removal of Arizona Crossings 2 and/or 3, only a portion of access may have to be closed. The trail splits at Arizona Crossing 2, and two trails are available from Arizona Crossings 2 to 3. The north trail (formal trail) will remain open and the informal south trail will be closed. Access could be maintained but would have to be managed with signs to direct hikers to the upper trail during the construction period. With the placement of signs as mitigation to direct hikers away from construction areas and inform them of alternate trails, temporary construction impacts would be less than significant.

Permanent removal of the Arizona crossings would result in the elimination of hazardous drop-offs adjacent to wet stream crossings. With two trails at Arizona Crossing 2, if the informal south trail were removed, there would be no impact as long as the formal main trail would remain. With the removal of Arizona Crossing 3, a slick wet cement crossing with a drop-off would become a wet cobble crossing at stream grade. This wet cobble crossing may represent an inconvenience. The impacts of removal of Arizona Crossing 3 would be less than significant after mitigation. The removal of the Arizona crossings should improve safety at trail stream crossings. Arizona Crossing 4 is not used by the public.

Mitigation – During construction, the construction staging area should be separated from the public by temporary fencing and warning signs. To the extent feasible, each separate construction area should be, at a minimum, cordoned off by tape or some type of temporary barrier if fencing is not feasible. Signs shall be placed warning of possible dangers at all construction locations. Signs shall explicitly warn of dangers in both English and Spanish. Consideration of placement of cameras in select locations may be warranted as the park has a past history of vandalism at construction sites.

Mitigation for the trail closures during construction shall include explicit signage in English and Spanish. If necessary, construction personnel may be required to be present at specific locations to assure that trail users do not cross into unauthorized areas that may pose a danger.

Mitigation for the loss of the Arizona Crossing 3 shall include signage that shows optional paths for other creek crossings.

Cumulative Impacts – Because safety concerns and trail closures during construction are temporary and can be mitigated to less than significant, they would not contribute to cumulative impacts to recreation. In the long-term, full removal of the check dams and Arizona crossings would remove safety risks to recreational users and would no longer contribute to cumulative risks to park goers.

Conclusions – During removal of the barriers, there may be some temporary trail closures and some temporary risks to the public from construction equipment. These impacts could be mitigated to less than significant with fencing and signs. In the long term, removal of the check dams and Arizona crossings would eliminate potential safety hazards. Loss of Arizona Crossing 3 could be mitigated to less than significant by signs directing hikers to an optional alternate trail.

5.4.3.2 Impacts to Visual Resources

The individual projects are small and would generally have little impact on the overall character of the visitor's visual experience. Partial removal of small dams will result in a more open, natural setting; however by retaining some of the check dams, some visual effect of a man-made structure will be retained. This may be less appealing than Alternative 1, which would remove all of the check dams. For Dam 1, the visual character of the waterfall will be removed, resulting in more of a stream-like setting. The concrete to be removed at the Arizona Crossings will result in a more natural environment. Overall, impacts are considered to be less than significant.

Cumulative Impacts – Removal of man-made structures would contribute in a small way to cumulative efforts to preserve and increase the natural setting of the Santa Monica Mountains. Partial rather than complete removal of the check dams would not contribute as much as Alternative 1 to return the Santa Monica Mountains to a natural setting as remnants of these man-made structures would remain.

Conclusion – Partial removal of the check dams and complete removal of the Arizona crossings would increase the natural setting of the park although aesthetically pleasing waterfalls at the check dams would be lost. In addition, the remnants of the check dams would retain man-made objects within the stream viewshed.

5.4.4 Impacts on Air Quality

Partial removal of the check dams and full removal of the Arizona crossings would involve essentially the same construction scenario as Alternative 1. Therefore air quality impacts would be the same. The daily threshold for NO_x could be exceeded, resulting in a short-term potentially significant impact to air quality that could be mitigated to less than significant.

Mitigation – The provided analysis indicates that NOx emissions are projected to exceed the SCAQMD's threshold criterion and mitigation is warranted to reduce these emissions to less than significant. Therefore, the following measures shall be implemented.

- All heavy equipment shall be maintained in a proper state of tune as per the manufacturer's specifications.
- Heavy equipment shall not be allowed to remain idling for more than five minutes' duration.
- Trucks shall not be allowed to remain idling for more than two minutes' duration.
- Electric power supplied from the power grid shall be used to the exclusion of gasoline or diesel generators and compressors whenever feasible.
- Heavy equipment aggregate use shall not exceed 80 hours per day.
- The construction contractor shall log equipment use, and a copy of the logs shall be retained at the project site for county inspection.

Level of Significance After Mitigation – As noted in Table 3 each piece of heavy equipment generates about 1.25 pounds of NOx per hour. A restriction to 80 hours of use would then generate approximately 100 pounds per day. The other noted measures could further reduce emissions by one to two percent, and the resultant levels would remain under the 100 pound-per-day threshold value reducing the impact to less than significant. Alternatively, if the generators and/or compressor are powered by electricity supplied from the grid, this would reduce NOx to less than a level of significance, alleviating the need for the other measures.

Cumulative Impacts – Cumulative projects include local development as well as general growth within the project area. However, as with most development, the greatest source of emissions is from mobile sources, which travel well outside the local area. Therefore, from an air quality standpoint, the cumulative analysis would extend beyond any local projects and, when wind patterns are considered, would cover an even larger area. Accordingly, the cumulative analysis for the project's air quality must be generic by nature.

The project area is out of attainment for ozone and PM_{10}. Construction and operation of cumulative projects will further degrade the local air quality, as well as the air quality of the SCAB. The greatest cumulative impact on the quality of the regional air cell will be the incremental addition of pollutants mainly from increased traffic from residential, commercial, and industrial development and the use of heavy equipment and trucks associated with the construction of these projects.

In accordance with the SCAQMD methodology, any project that is less than significant or can be mitigated to less than significant does not add significantly to the cumulative impact. Implementation of the noted mitigation measures would ensure that project construction does not exceed the daily threshold limitations, reducing the impact to less than significant. This then also reduces the project's contribution to the cumulative impact to less than significant.

Conclusion – Alternative 2 would have a potentially significant short-term air quality impact by exceeding the threshold for NO_X emissions. This short-term air quality impact can be mitigated to less than significant.

5.4.5 Impacts on Noise

Partial removal of the check dams and full removal of the Arizona crossings would involve the same construction scenario as Alternative 1. Therefore, the noise impacts of Alternative 2 would be the same as for Alternative 1. Although demolition of the crossings and partial removal of the check dams would temporarily elevate noise levels in the park, these impacts would be less than significant because sensitive receptors would not be affected.

Cumulative Impacts – During the period that demolition of the in-stream barriers was occurring, the noise of construction equipment would contribute to cumulative noises (such as vehicle traffic in the project area). Demolition activities would be short-term and would not impact any sensitive receptors. Therefore, Alternative 2's contribution to noise impacts would be less than significant.

Conclusion – Demolition of structures would raise noise levels in the project area during the time that it would take to remove the barriers. However, no sensitive receptors would be affected by this short-term increase in noise, and impacts would be less than significant.

5.4.6 Impacts on Transportation/Traffic

Because construction for Alternative 2 would be similar to that for Alternative 1, traffic/transportation impacts for partial removal of the check dams and full removal of the Arizona crossings would be the same as for full removal of all the structures. There would be a temporary small increase in park traffic during times when the park was open during demolition activities. The impacts to traffic and transportation would be less than significant.

Cumulative Impacts – Because there will not be a permanent increase in traffic, there will be no cumulative addition to the roadways in the area, and no impacts to established congestion management plans.

Conclusions – The partial removal of the check dams and the complete removal of the Arizona crossings would result in a minor temporary increase in traffic within the park, but impacts would be short term and less than significant.

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APPENDIX A

SPECIES OCCURRING AT THE FOUR DAM AND FOUR ARIZONA CROSSING LOCATIONS

Appendix A
Species Occurring at the Dam and Arizona Crossing Locations

Solstice Canyon Creek Vegetation survey for Dam and Arizona Crossing removal
30 July – 02 Aug 2004

DAM SITE 0; E338652 N3767513 El. 19 m
Alnus rhombifolia dominant overstory with understory characterized by *Salix lasiolepis, Rubus ursinus,* and *Hoita machrostachya.*
Other trees: *Juglans californica, Platanus racemosa, Quercus agrifolia,* and *Umbellularia californica.*
Herbacious species: *Euphorbia peplus*, Euphorbia terracina*, Lathyrus vestitus, Marrubium vulgare*, Plantago major*, Rorippa nasturtium-aquatica,, Sonchus oleraceus*, Stellaria media*.*
Grasses, Sedges and Rushes: *Cyperus involucratus*, Ehrharta erecta*, Juncus xiphioides, Leymus condensatus.*

DAM SITE 1; E 338606 N 3767518 EL. 31 m
Alnus rhombifolia dominant overstory with *Rubus ursinus – Artemisia douglasiana* dominated understory.
Other trees: *Juglans californica, Platanus racemosa, Salix lasiolepis, Umbellularia californica.*
Other shrubs: *Clematis ligusticifolia.*
Herbacious species: *Adiantum capillus-veneris, Artemisia douglasiana, Epilobium ciliatum, Equisetum telmateia* ssp. *braunii, Euphorbia terracina*.*
Grasses, Sedges and Rushes: *Cyperus involucratus*, Ehrharta erecta*, Juncus xiphioides, Leymus condensatus.*

DAM SITE 2; no signal for gps
Alnus rhombifolia dominated overstory with and understory dominated by *Rubus ursinus* and *Toxicodendron diversilobum.*
Other trees: *Platanus racemosa, Salix lasiolepis.*
Other shrubs: *Hoita machrostachya.*
Herbacious species: Eu*phorbia peplus*, Euphorbia terracina*, Plantago major*, Sonchus oleraceus*, Rorippa nasturtium-aquaticum, Rumex conglomeratus*.*
Grasses, Sedges and Rushes: *Cyperus involucratus*, Ehrharta erecta*, Juncus xiphioides, Piptatherum miliaceum*.*

DAM SITE 3; no signal for gps
Alnus rhombifolia dominated overstory with understory of a mix of shrubs and herbs.
Other trees: *Juglans californica, Platanus racemosa.*
Other shrubs: *Baccharis plummerae* ssp. *plummerae, Malosma laurina, Rubus ursinus.*
Herbacious species: *Artemisia douglasiana, Brickellia californica, Euthamia occidentalis, Foeniculum vulgare*, Hazardia squarrosa.*
Grasses, Sedges and Rushes: *Cyperus involucratus*, Ehrharta erecta*, Koeleria phleioides*, Piptatherum miliaceum*.*

DAM SITE 4; E338257 N3768272
Alnus rhombifolia overstory with an understory of a mix of shrubs and herbs.
Other trees: *Sequoia sempervirens.*
Shrubs & woody vines: *Baccharis plummerae* ssp. *plummerae, Hoita machrostachya, Rubus ursinus, Toxicodendron diversilobum.*
Herbacious: *Adiantum capillus-veneris, Mimulus cardinalis, Vinca major*.*
Grasses, sedges & rushes: *Piptatherum miliaceum*.*

AZ Xing 1 (@ Keller House); no signal for gps
Alnus rhombifolia – Platanus racemosa overstory with an understory of various herbs and grasses, and abundant moss cover on the dam drop off.
Herbacious species: *Adiantum capillus-veneris, Artemisia douglasiana, Mimulus cardinalis, Plantago major*, Tropaeolum majus**.
Grasses, sedges & rushes: *Bromus diandrus*, Cyperus involucratus*, Koeleria phleoides*, Leymus condensatus, Piptatherum miliaceum**.

AZ Xing 2; (E338257 N3768242 El. 55 m)
Alnus rhombifolia - Quercus agrifolia - Platanus racemosa - Umbellularia californica overstory with an understory of *Rubus ursinus* and *Toxicodendron diversilobum.*
Herbacious species: *Lilium humbodtii ssp. ocellatum, Pteridium aquilinum, Vinca major**.
Grasses, sedges & rushes: *Ehrharta erecta*, Piptatherum miliaceum**.

AZ Xing 3; E338230 N3768397
Alnus rhombifolia - *Quercus agrifolia - Umbellularia californica* overstory with an understory of *Toxicodendron diversilobum, Rubus ursinus* and a mix of herbs and grasses.
Other trees: *Juglans californica, Platanus racemosa.*
Other shrubs: *Baccharis plummerae* ssp. *plummerae, Heteromeles arbutifolia, Venegasia carpesioides.*
Herbacious species: *Adiantum capillus-veneris, Bidens pilosa* ssp. *pilosa*, Brickellia californica, Datisca glomerata, Epilobium ciliatum, Euphorbia terracina*, Euthamia occidentalis, Hirschfeldia incana*, Mimulus cardinalis, Plantago major*, Rumex conglomeratus*, Solanum douglasii, Taraxacum officinales*, Vinca major**, Unknown 1.
Grasses, sedges & rushes: *Bromus carinatus, Bromus diandrus*, Cyperus involucratus*, Ehrharta erecta*, Juncus* sp., *Koeleria phleoides*, Melica imperfecta, Piptatherum miliaceum**.

AZ Xing 4; E338180 N3768694
Quercus agrifolia – Umbellularia californica overstory with an understory of various shrubs and herbs.
Other trees: *Juglans californica , Platanus racemosa.*
Shrubs: *Hoita machrostachya, Keckiella cordifolia, Mimulus aurantiacus, Rhus ovata, Rubus ursinus, Toxicodendron diversilobum.*
Herbacious species: *Adiantum capillus-veneris, Mimulus cardinalis.*
Grasses, sedges & rushes: *Cyperus involucratus**.